INEQUALITY AND THE RENTIER STATE:

VERTICAL AND HORIZONTAL

INEQUALITY PATTERNS IN IRAN

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Declaration for PhD thesis

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Abstract

There is a paucity of literature addressing Iran's consistently high income inequality rates during the past four decades. Available studies, after the 1979 Islamic revolution, typically combine poverty with inequality research but focus decidedly on the former. Perhaps, due to this poverty orientation, they seek inequality determinants within the pool of post-revolutionary government policy. This thesis however suggests a pre-revolutionary structural cause, rather than a post-revolutionary policy determinant, for the observed inequality. It contends that many of the income distribution patterns in Iran are related to the economy's reliance on oil revenues, which overwhelm administrative efforts in reshaping national and regional income distribution. The study has wider theoretical implications by showing that rentier states reinforce patterns of income distribution.

The period under empirical study (1997-2010) begins with the tenure of President Khatami's first government and ends in the twilight years of President Ahmadinejad's second administration. Annual household survey micro data is used to measure and present a number of income distribution findings which are brought together to build a picture of recent national and regional inequality trends using appropriate decomposition methodologies.

In the main, the findings support the rentier notion of an urban bias and the existence of a rich elite whose fortunes mostly determine annual inequality fluctuations. Inter-regional and intra-regional inequalities are both high, with evidence of an increasing income gap between rural provinces. There is a growing gap between public sector and private sector headed households and a persistently high urban rural divide. Interestingly, regional inter-ethnic inequality is falling. At the end of the thesis, separate urban and rural wealth asset indices are created for Iran to mitigate the influence of short-term oil revenue shocks, which may affect money metric inequality measures.

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Glossary, acronyms and abbreviations

SCI	Statistical Centre of Iran
CBI	Central Bank of Iran
IRNA	Islamic Republic of Iran's News Agency
NIOC	National Iranian Oil Company
COICOP	Classification of Individual Consumption According to Purpose
HE	Aggregate household expenditure
HEWI	Aggregate household expenditure without investment
HEWID	Aggregate household expenditure without investment and durables
EEHE	Aggregate equivalence household expenditure
EEHEWI	Aggregate equivalence household expenditure without investment
EEHEWID	Aggregate equivalence household exp. without investment or durables
CURD	Coordinated Urban-Rural Development

Glossary

Shahrestan	This term refers to all Iranian towns and cities apart from Tehran
Basiji	A member of the "Basij-e Mostazafin", a post-revolutionary voluntary militia
Bazaaris	From the word "Bazaar" refers to the merchant class
Aashnaa	An acquaintance
Party	From the term "Party Baazi" refers to a person of influence
Jahad-e Sazandegi	The construction crusade
Bonyad-e Maskan	Housing Foundation
Bonyad-e Mostazafan	Foundation of the oppressed
Bonyad-e Shahid	Foundation of the martyred
Bonyads	A collective term for the revolutionary 'charitable' trusts set up after 1979

A. Introduction

Ever since 1979, the Iranian economy has experienced continuous upheavals. The period began with an Islamic revolutionary administration advocating largely state socialist policies, which included pushing through an agenda of substantial nationalization and asset redistribution within a very short period of time (Behdad, 1989). Simultaneously, non-governmental organizations with a revolutionary zeal for rural development were setup to provide housing, infrastructure and health services to Iran's most deprived regions (Amirahmadi, 1986).

From 1980 to 1988, a catastrophic eight-year war with Iraq ensued, resulting in a pattern of rapid urban agglomeration, rural disintegration and the complete disruption of the pre-revolutionary economic system (Sharbatoghlie, 1991). Rationing, subsidies, coupons, price controls, multiple exchange rates, trade restrictions, and international embargoes characterized economic life for ordinary Iranians. An attempt at normalization, economic liberalization and industrialization followed the war, under the presidency of Hashemi Rafsanjani. Notably, accessibility to higher education was widely increased. However, erratic growth, a lax monetary policy and high inflation created uncertainty and flux in the economy.

From 1997, President Khatami pursued a policy of further economic liberalization, privatization and industrialization. By the end of his term, government revenues were still dominated by oil exports, and subsidies on fuel and public utilities had mushroomed (Machin and Vignoles, 2004). Under President Ahmadinejad's administration from 2005, the government espoused its commitment to redistribution in favour of the poor combined with a drive towards regional equality (Salehi-Isfahani, 2008). In this regard, President Ahmadinejad and his ministers dramatically increased the number of official visits to the

provinces.[1] An ambitious program was also initiated to lift general subsidies, with the intention of using a portion of the savings to eventually target the most needy (Guillaume et al., 2011). The government benefited from rising oil prices but at the same time the economy became more dependent on oil exports. Oil revenue as a percentage of GDP rose from 20% in 1997 to 38% in 2008[2]. Towards the end of this period, international sanctions on Iran were intensified, and by mid 2012 Iran was under the harshest sanctions regime since the nationalization of the oil industry in 1951.

Hence, Iran's post-revolutionary economy is characterized by numerous fluctuations and turns of fortune. Many economic indicators for this period are characterized by dramatic trends or high volatility. Between 1979 and September 2012 the value of the currency fell by a factor of 350 against the US dollar. In 1976 53% of Iran's population lived in rural areas, dropping to 31.5% by 2006. In welfare terms poverty has decreased, higher education enrolment has dramatically increased and rural infrastructure and health services have improved (Salehi-Isfahani, 2006a).

But there is one measure that has remained largely stable throughout this period. By and large income inequality has not been prone to significant fluctuations or long lasting diminishing or increasing trends. This constancy is despite the dramatic changes in other post-revolutionary economic indicators. The immovability of inequality, and the failure to move towards a more equal distribution of income, evokes further curiosity given that egalitarianism occupies a central position in Iran's political discourse, and is implicitly referred to as a condition for growth in the revolutionary constitution of the Islamic Republic[3].

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[1] For an account of these visits see http://www.guardian.co.uk/world/iran-blog/2012/apr/19/mahmoud-ahmadinejad-provincial-visits-protests

[2] Source: World Bank, Iran Country Data

[3] "In strengthening the foundations of the economy, the fundamental consideration will be fulfillment of the material needs of man in the course of his overall growth and development. This principle contrasts with other economic systems, where the aim is concentration and accumulation of wealth and maximization of profit. In materialist schools of thought, the economy represents an end in itself, so that it comes to be a subversive and corrupting factor in the course of man's development. In Islam, the economy is a means, and all that is required of a means is that it should be an efficient factor contributing to the attainment of the ultimate goal." The Constitution of the

Indeed, one would expect many of the post-revolutionary policies of extensive asset redistribution, poverty reduction, rural infrastructural investment and expansion of higher education to have had a significant impact on inequality. Yet, they haven't. This paradox has not been directly addressed by academic research. Empirical studies of Iran's income distribution are usually part of, and subordinate to, larger poverty studies. Beyond the reporting of the headline inequality figures and confirming their constancy, they offer little extra insight. The challenge of inequality research in Iran is this very 'consistency'. It is problematic to convincingly relate constant inequality to volatile post-revolutionary economic trends.

Since 1979, almost all economic research carried out on Iran has been through a post-revolutionary lens. This is to a large extent understandable given the initial considerable shock to the economy from the Islamic revolution, the war with Iraq, and the substantial economic adjustments that followed. But what if there are economic indicators that are not fundamentally related to post-revolutionary policy? Are we not in danger of overlooking them because of our fixation with the government's performance after the revolution? Is income distribution one of these economic indicators? We suspect that it is, and this forms the premise of our thesis.

If we put aside our post-revolutionary lens for a moment, and rather than examining what has changed since the revolution, we focus instead on what remains the same. The major indistinguishable characteristic of Iran's economy pre and post revolution is its reliance on oil revenues. We hypothesize that the rentier nature of the state, from its considerable dependence on oil export revenues, has reinforced structural income inequalities, and that the dominance of oil revenues provides the best explanation for the inability of successive administrations to shift the income distribution.

Islamic Republic of Iran, Bern University, International Constitutional Law, http://www.servat.unibe.ch/law/icl/ir00000_.html

In order to examine this premise, we set ourselves two objectives. Given the paucity of research on income inequality in Iran, our first and primary objective is to measure and analyse the major patterns and trends of Iran's income distribution. The bulk of our thesis is dedicated to this empirical task. Our second objective is to survey the literature and propose a link between the rentier nature of a state and the likely income inequality patterns. By matching our empirical findings with the expected patterns we hope to be able to shed some light on the hypothesis.

B. Specific research questions

As noted in the introduction, little research has been carried out on income distribution patterns and trends in Iran, due to the stable, if high, income inequality rate. In order to shed more light on the inequality measure, we propose to break it down into its geographic components and its vertical and horizontal facets. In doing so, we hope to provide answers to the following broad questions.

Descriptive empirical questions

1. What are the recent levels and trends of urban and rural national inequality?
2. What are the geographic component contributions to overall inequality?
3. What are the levels of inequality between the provinces?
4. What is the pattern of income inequality within the provinces?
5. What are the trends of urban/rural disparity?
6. What is the level of ethnic inequality?

Analytical empirical Questions

1. What factors account for the small year on year fluctuations in the national inequality measure?

2. What structural effect does direct government expenditure of a rentier state have on income distribution?
3. How are subsidies affecting inequality, and what is the likely effect of their removal?
4. Are urban and rural areas within provinces converging? Is there evidence of polarization?
5. What are the differences of the urban/rural divide along the national income distribution?
6. Are ethnic inequalities converging or diverging?
7. What are the income distribution differences between private and public sector headed households?
8. Can an effective asset index be created for Iran from existing household data to provide an alternative inequality measure?

In conclusion to this thesis we examine to see whether the findings match our hypothesized rentier theory implications for income inequality.

Chapter two discusses in detail possible links between an economy dominated by oil revenues and the pattern of inequality. In general terms, however, we can sum up our expectations of inequality in a rentier state as thus. We expect to see an urban bias in government expenditure, with a few urban centres dominating the contribution to inequality. The fortunes of the rich elite are expected to dominate the income inequality trend. The public sector should yield the richer households as this sector has direct access to state oil rents. Urban and rural disparities are not expected to diminish given the government urban bias, and the excess labour capacity present in urban areas. We do not expect to see convergence between the provinces, as the initial regional rentier advantage followed by urban agglomeration should lead to a few provinces dominating others. Conversely, the poorest provinces will find it difficult to catch up.

Given the lack of linkages between the domestic economy and the oil industry, we do not expect oil led growth or increases in household income to be a factor in determining inequality within the provinces. Kuznets' inverse U shaped inequality curve should therefore be redundant in a rentier setting. Finally if Persians dominate the ruling rentier class, there should be a non-diminishing inequality trend between this ethnicity and the others.

As already noted, the primary objective of this thesis is to arrive at a big picture of Iran's major vertical and horizontal inequality patterns. Post-revolutionary Iran is an apt choice for the study of income distribution in a rentier state, because not only does it have an economy reliant on oil exports, but it is also characterized by revolutionary Islamic administrators who have, openly at least, been committed to reducing income inequality. The case study of Iran sheds light on how rentier structures can hamper policies aimed at bringing about a more equal distribution of income.

C. Rationale and motivation

a. Academic rationale

Three major academic objectives underlie this study. The first derives directly from the paucity of inequality research in Iran. Answers to significant income distribution questions are currently not to be found in published research. What is the urban GINI figure for Tehran? What is the rural sector's contribution to overall inequality? Are Persian dominated regions pulling away from ethnic ones? This research gap drives the motivation to find out the answers to a number of inequality puzzles related to Iran. Although we aim to examine these findings in the context of a 'rentier theory framework', such empirical data may also prove useful for academics researching other aspects of Iran's economy, or indeed may be utilized by researchers in other fields of Iranian studies.

The second academic motivation is a desire to invite further academic study on the income distribution field in Iran and other rentier states. We suggest that in such countries

income inequality is characterized by a unique structural pattern, which is worthy of further research. Currently, economists may find it challenging to research one particular aspect of inequality in Iran, such as gender, occupation or religion in isolation, without being aware of other major inequality trends. For instance, religious inequality may be a microcosm of wider ethnic inequality, or certain occupational inequalities may be related to disparities between the private and public sector. By being aware of dominant inequality patterns, researchers can factor them into their study and arrive at more conclusive findings. The creation of an asset index in chapter seven provides a simple household wealth assessment tool to encourage Iran researchers of all fields to take into account the inequality and wealth aspects of their studies.

Finally by examining the current patterns of inequality in Iran, we can develop an understanding of where Iran is heading if current trends continue. This should assist policy makers in targeting their attention to the appropriate areas of the economy. A realization that the distribution of income is a structural problem in Iran and most probably in other rentier states, lends support to proponents of policies that advocate a reduction in the role of oil exports in the economy.

It is hoped that this study proves significant by empirically providing new data on income inequality patterns in Iran and by theoretically exploring the income distribution implications of rentier state theory.

b. Personal motivation

For ten years 1999-2009, falling within the period of this empirical study, I managed an online Persian and English news website in Tehran. Our news service was widely read inside and outside Iran and had a dedicated ‘Iran economy’ category. We had an average of a dozen employees during this time. Until 2008, and the onset of the global financial crisis, this was a period of relative stable growth, and steady wage increases. Despite this, due to

rapidly increasing property and rent prices, it was virtually impossible for many of the staff to move a step up the relative economic ladder or even dare to dream of owning a property in central Tehran. I came to the view that economic mobility was rare and not directly linked to educational achievement or hours of hard work in the office. It is important to note that these observations were anecdotal in nature and not based on any data.

I also regularly took many road trips throughout Iran. Often, I would drive by abandoned villages and townships in one region, only to arrive in a thriving urban centre in another. There were also many isolated industrial complexes dotted along the way. The geographical difference in income distribution was apparent to the untrained eye.

In Tehran and the other big cities, residents who had the necessary funds would mostly look to land and property speculation as an investment avenue, rather than invest in long-term business activities. Many of the property developers were for instance doctors who alongside their medical practices looked for a shorter-term but more lucrative trade. It was an economy seemingly characterized by high income inequality, which did not offer a straightforward transitional route to an upper income group via the most expected routes such as higher education, employment and private sector promotion. Meanwhile, many landowners, small and big, in the suburbs of major urban centres would effortlessly become rich, as urban agglomeration took hold.

If the ‘expected’ economic factors, such as education, would in the main, not allow individuals to move to relatively higher income groups, then surely nor would the policies aimed at boosting such factors. The thinking behind this thesis arose out of this simple logic. The led to the premise that Iran is characterized by a structural inequality pattern, which is difficult to shift by the government, utilizing standard sectoral policy tools.

In the course of compiling this thesis I have met the two economists who have arguably contributed the most to Iran’s poverty and inequality literature for the past two decades. They provided extra motivation and guidance. Before the empirical research process, I had an extensive meeting with Professor Mohammad Tabibian in Tehran,

regarding his book (in Persian) on poverty and inequality in Iran (Tabibian, 2000). Towards the end of my research, at a conference in London, I met Professor Djavad Salehi-Isfahani who has published many papers (in English) on Iranian welfare economics (Salehi-Isfahani, 2006b, Salehi-Isfahani, 2007, Majbouri and Salehi-Isfahani, 2008, Salehi-Isfahani, 2008, Salehi-Isfahani, 2010). Both academics have been widely cited throughout this study.

D. Research approach

Of the two research objectives of this study, the empirical one is the most challenging. It would be academically sensible to focus on just one particular aspect of inequality in Iran and combine that with other published data to arrive at a conclusion. However such published data is not available. Beyond the availability of the national income inequality rate, there is a scarcity of money metric inequality analysis. Even with the national inequality rate, publications do not always make it clear how the measure has been arrived at.

Without such data, it is difficult to report a definitive finding on one particular aspect of inequality in isolation. For instance, regional inequality may be investigated, but without having some indication of urban/rural disparities, one cannot draw conclusions as to whether the witnessed inequality between two regions is a regional one or simply an urban/rural one. Furthermore, in order to link the empirical findings to the theoretical implications of rentier theory on income distribution, a core number of inequality patterns and trends need to be measured and analysed. One or two characteristics are not sufficient to establish that Iran's income distribution is in line with the theorized structural inequality pattern of a rentier state.

Thus, it was deemed necessary to make the thesis primarily empirical in nature and concentrate on deriving the major patterns and trends of Iran's income distribution. Alongside this wide empirical approach, an attempt has been made throughout the study to point out the significance of the main findings as they relate to inequality patterns in a rentier setting.

E. Scope and limitations

Given the extensive empirical task at hand, the scope of the research was purposefully limited by two intuitive restrictions:

1. The major patterns and trends of income distribution would only be measured and analysed, rather than also taking on an investigation of their individual determinants
2. Only results pertaining to the rentier theory inequality hypothesis would be reported.

It will therefore be outside the scope of this study to rigorously test for all possible determinants of inequality and claim causation. There are many potential deterministic factors of national and regional inequality, such as education, health, transport, infrastructure, water resources, agricultural investment, proximity from urban clusters, provincial investment etc. which may all have a bearing on inequality in Iran. These specific research areas are worthy of study in their own right. Our concern is with deriving the main patterns and trends of income distribution and examining whether they match the expected rentier predictions.

F. Empirical methodology and data

This study relies fundamentally on urban and rural annual household surveys carried out by the Statistical Centre of Iran (SCI). The integrity of this data is assumed to be sound. Without the availability of micro data from the SCI, this research project would not have been viable. During multiple trips to Iran, throughout the period of the research, the SCI supplied the author with the latest raw primary unit data, along with relevant clarifications. At first, the sampling weights for the datasets were not made available, and they were estimated by the author using national census data. However, during the midpoint of the study, exact sampling weights dating back to 1997 were released by the SCI, and all calculations and analyses were repeated using the official weights. Over four hundred

thousand household samples have been used in our calculations for the period of 1997-2010.

For reasons explored in chapter three, expenditures rather than income data have been used as a proxy to derive a pattern of income distribution. The expenditure datasets were processed using queries written by the author, to re-categorize them into a standard format. Separate urban and rural equivalence scales have been devised to distinguish between urban and rural households, and to account for different family sizes and the makeup of adults and children.

The processing of raw micro data presents many challenges, but it also provided the author with many opportunities to carry out custom analysis. Micro data allows for richer analysis than the traditional use of average aggregate data (Carlos, 2001). For instance the author was able to standardize the categorising of expenditures, to build custom consumption aggregates, to create and implement an equivalence expenditure scale, to decompose the data into numerous components, to carry out intricate horizontal income distribution comparisons and to construct an urban and rural wealth asset index.

The asset index methodology is outlined in detail in chapter seven. The reasoning behind its construction was to provide an alternative tool to the traditional money metric inequality methodologies, and it was deemed particularly appropriate for a rentier state such as Iran, which is prone to macro-economic shocks.

Although the primary data sources for this study are the SCI's annual household surveys, a number of other datasets were also utilized such as:

- SCI urban and rural CPI figures
- Central Bank of Iran CPI figures
- SCI census data
- SCI household population data
- SCI migration data

- SCI provincial accounts
- SCI yearbook for general macro-economic indicators
- The World Bank database
- The IMF ‘World Economic Outlook Database’

Any data source that does not derive from the author’s own calculations and measurements is cited alongside the respective chart or table.

G. Thesis outline

Introduction

The introduction outlines the significance of the inequality paradox in Iran, and the suggested approach to addressing this gap in the research. We introduce the hypothesis that a rentier state, such as Iran, reinforces structural patterns of inequality, which are not effectively addressed by government sectoral policy. The specific research questions, scope and limitations of the study are highlighted. We establish why the core of the study is dedicated to the empirical measurement and analysis of the major inequality patterns in Iran. The empirical methodology and sources of data are briefly described. At the end of the introduction a summary of the thesis chapters is provided.

Chapter 1 – Literature Review

This chapter explores the broad literature on income distribution, and suggests that Iran's inequality patterns cannot be adequately assessed using existing approaches. Income inequality debates relating to growth, demography and politics are briefly discussed.

Chapter 2 – Iran, income inequality and the rentier state

A critical survey of the current academic research approach to income distribution in Iran is carried out, and it is suggested that an extension of the rentier literature may provide a better framework for addressing the country's seemingly immovable and consistently high income inequality rate. The scarcity of research on Iran's income distribution is highlighted despite welfare economics occupying the heart of Iran's political economy discourse. Existing research is demonstrated to stem from a post-revolutionary perspective and is coupled with a fixation on poverty. Both these factors have diverted researchers away from investigating the possible structural nature of Iran's observed inequality. We finish the chapter by combing

through rentier theory literature and considering how a host of vertical and horizontal inequalities may be difficult to remedy in a rentier state.

Chapter 3 -

Chapter 4 – Methodology

The methodology chapter starts by providing an account of Iran's annual household surveys. We briefly explore the methodology of the surveys themselves. The benefits of using micro data in relation to our study are outlined. The processing of the datasets in preparation for the inequality calculations is described. We explore possible proxy candidates for income distribution and the reasoning behind finally settling for expenditure data. The choice of an appropriate consumption aggregate is also discussed and an empirical comparison is made between the various options. Given that the author did not come across an equivalence scale for Iran, a separate urban and rural expenditure scale is created to adjust household expenditures for family size and makeup. Empirical comparisons between non-scaled and scaled data are made. The chapter finishes by surveying the inequality tools to be used in the study, and by suggesting methodological improvements for future research.

Chapter 5 – Vertical inequality

This chapter opens by explaining why we have chosen to empirically examine the 1997-2010 period. The derived national inequality measures are presented. The urban bias of government expenditures is investigated. The small fluctuations apparent in the inequality rate are analysed and we suggest that they are mostly related to the top income group and the urban/rural divide. We go on to present how the distribution of income has evolved during this period. The inequality effect of subsidies and their recent lifting is explored. The final section is dedicated to the geographic decomposition of inequality. The 'Theil index'

inequality measure is broken down into its urban, rural and provincial components, and the contribution of these components to the overall inequality rate is presented and discussed.

Chapter 6 – Inter-provincial inequalities

This chapter starts by considering the significance of regional inequality in Iran. It briefly surveys the different approaches adopted by Iran researchers in explaining provincial disparities. We go on to present the levels of inter-provincial inequality and thematically map the inequalities separately for the urban and rural sectors. We dismiss the traditionally accepted notion of Iran being characterized by a rich central region surrounded by a ring of poorer periphery provinces. For the period under study, the provinces are examined for signs of convergence and polarization. Finally, in the context of the hypothesized rentier theory predictions, we test for the relationship between growth and convergence.

Chapter 6 – Horizontal inequalities

Following chapter five's focus on inter-provincial inequalities, in this chapter we examine four other horizontal inequalities. The differences in 'within inequality' between the provinces, the urban/rural divide, ethnic regional inequality and the disparity between public and private sector headed households. The levels of intra-provincial (within) inequality are presented, and their geographic and urban/rural dimensions considered. We test for Kuznets inverted U shaped curve in the context of a rentier state. A detailed analysis of the urban/rural divide is carried out by comparing how different sections of their respective distributions compare against each other. The geographic manifestation of this disparity is also presented. We then compare the mean household expenditures of the ethnic dominated regions of Iran against the Persian dominated regions. For each ethnicity, we test for signs of convergence between the Persian regions and other ethnic regions. Finally we end the chapter by examining the horizontal inequality between public and private sector headed households.

The inequality ‘between and within’ these two groups, as well as the urban and rural dimensions of their disparity is analysed.

Chapter 7 – Asset index

In order to present an alternative to a money-metric inequality measure prone to oil shocks, we create an urban and rural asset index for Iran. The reasoning behind their creation, as well as the advantages and disadvantages of such wealth indices are discussed. We outline the methodological and data challenges of finding the perfect asset mix from the annual household survey data. Finally, both the urban and rural asset indices are presented and tested for coherence and robustness. They can be used as a quick, reliable and simple inequality tool by other researchers to derive a wealth score for any household in Iran, without going through the cumbersome and time consuming process of compiling and processing expenditure data.

Chapter 8 - Conclusion

In the concluding chapter we look back at our initial hypothesis and research questions, and examine how this research fits into the overall economics literature. The major findings arising from the methodology, the literature, the empirical study and the creation of the asset index are presented. The empirical findings are presented in tabular format. Based on these results, policy recommendations for Iran and possibly other rentier states are outlined. The limitations of our analysis and possible avenues of future research following on from this thesis are highlighted. Finally, we end the chapter by considering the wider implications of our findings.

1.0 Literature Review

1.1 Introduction

This chapter briefly presents the multifaceted approaches within the literature to inequality. Debates pertaining to the causality of income distribution such as growth, demography and politics are introduced. A more in-depth literature review focussing on income distribution in Iran is provided in chapter two.

1.2 Defining inequality

Inequality is not self defining (Cowell, 2000). It is open to a vast array of equally valid interpretations. These definitions can be framed by considering *what* is being distributed and *amongst* whom. As well as money metric measures, such as income, expenditure and assets, the 'what' can refer to broader concepts of inequality, such as the ease of access to education, health or other public goods, or inequality in the availability of capital, social mobility and opportunity.

The 'whom' in inequality analysis is also an open field and as well as other measurable units, may refer to the individual, the household, a geographic region or different occupations.

Within the following literature review we adopt the most commonly used definition of inequality by economists, focusing on the distribution of *income*. This definition is narrowed further in the empirical chapters by considering only the distribution of *expenditure* amongst *households*.

Our references to vertical inequality denote the differences between expenditures of households within the same group; for instance, the income distribution within Iran, or in the rural sector or in the public sector.

Horizontal inequality is often the forgotten dimension of income inequality analysis (Stewart et al., 2005) and denotes inequality between groups. Frances Stewart, who coined the term, defines it as the "existence of severe inequalities between culturally defined groups" (Stewart, 2001, p.3). For the purposes of this research, our definition is broader and horizontal inequality measures will be estimated between groups which also differ in 'non-cultural' ways.

1.3 The significance of inequality

The debate on inequality was, and is to some extent even today dominated by the question of whether inequality matters (Jencks, 2002). This debate was sparked by the influential paper by Kuznets (1955). By contending that the level of inequality is a by-product of growth, Kuznets inadvertently relegated the perception of inequality from an economic indicator of grave concern to an inevitable 'symptom' of economic growth. As Stewart (Stewart, 2000b, p.5) puts it, the Kuznets curve has sometimes been "used as an excuse, for taking no action on income distribution."

Looking at levels of income per capita (not growth of income) across countries, Kuznets' general contention was that inequality would rise during the initial stages of development, eventually peak and then start to lower in the latter stages, giving rise to his famous inverted U shaped inequality curve. He suggested that this was primarily caused by the dynamics of a switch from an agricultural rural based economy to an industrial urban one.

Further empirical studies on growth and income distribution have led to at best a mixed verdict on the Kuznets theory (Anand and Kanbur, 1993, Deininger and Squire, 1998), and a large critical literature has emerged questioning both the premise of the theory and its public policy consequences.

Critics of the Kuznets theory can be grouped into three broad camps, although they are not mutually exclusive. The first camp question the purported mechanism behind the

inverted U shaped curve as being a consequence of a sectoral shift from agriculture to industry and suggest alternative economic and non-economic indicators as the cause. For instance, Acemoglu and Robinson (2002) propose institutional and political changes as the primary factors, which result from the growing power and influence of the masses over the elite. Another suggested mechanism is an asset distribution explanation. The initial growing inequality in the ownership of assets is diminished as labour incomes rise relative to diminishing returns on capital (Aghion and Bolton, 1997).

Critics of the theory in the second camp completely reject the notion of an inverted U shaped curve all-together. Ahluwalia (1976) finds no evidence of a link between *growth* of per capita income and inequality. Country studies show that inequality has improved during growth periods in some and worsened in others, with no obvious linkage to their stage of development (Bruno et al., 1996, Acemoglu and Robinson, 2002).

The third camp takes what can be considered as almost a dichotomous view to Kuznets, contending, that in the main, more equal income distribution enables higher growth (Adelman and Morris, 1973). It challenges the very notion of the 'grow first and redistribute later' school of thought. Alesina and Perotti (1994) find that income inequality is inversely related to investment and hence growth. They argue that socio-political instability fuelled by income inequality brings about this negative relationship. Investigating countries with democracies, Persson and Tabellini (1991, p.617) find that "income inequality is harmful for economic growth" as it leads to skewed political policies, which do not protect property rights and do not optimize return on investment. Perotti (1996) links fertility negatively to the income share of the middle class, contending that more equality will reduce the birth rate and aid growth.

While the mechanisms linking high growth to low inequality may seem anecdotal, the main consequence of the critical literature on the Kuznets theory has not been to establish an alternative link to growth, but rather to question the validity of the post-Kuznetsian predicament of choosing between growth or equality for developing nations. This

can be seen by looking at the evolution of language by the World Bank from a report in 1974 (Chenery et al., 1974) which while acknowledging that “active intervention was required to manage the distributional consequences of growth processes” (Kanbur, 2000, p.3), is at the same time implicitly acknowledging that inequality may be an inevitable consequence of growth. But by 1990 the World Bank (World Bank, 1990) was arguing that growth and equality could go hand in hand.

This view of inequality as a significant economic indicator, which can be influenced independently of growth, has brought the literature on the non-growth factors affecting inequality to more prominence. Inequality now has a firm footing as a topic of significance in its own right. In 1996, the Presidential Address in the Royal Economics Society by Anthony Atkinson was titled “Bringing Income Distribution in from the Cold” (Gregorio and Lee, 2002b, p.1). This renewed interest for inequality has led to a surge of research exploring the non-growth factors behind unequal income distribution and the mechanisms for tackling it.

1.4 Factors of influence on income distribution

1.4.1 Macroeconomic factors

Apart from growth there are a host of other macroeconomic factors which may impact inequality (Kaasa, 2003). Higher inflation has been found to worsen the real incomes of the poor in relation to the rich. Bulíř (1998), looking at a set of developing and developed economies (including Iran), finds that there is enough evidence to suggest that a lower inflation rate will improve the distribution of income, but this is not a simple linear relationship, and inflation has a lesser effect as it becomes lower. The relationship is most prominent for low to middle income countries with very high inflation rates. There are conflicting studies on inflation with Gustafsson and Johansson (1999) finding that the link between inflation and inequality may be reversed by introducing a very progressive tax system.

The link between unemployment and inequality is perhaps better established. Björklund (1991) finds a link between higher unemployment and worsening income distribution for Sweden. Gustafsson and Johansson (1999) find that very high unemployment tends to worsen the situation of those at the bottom of the income scale. Martínez et al. (2001) find a mixed relationship for OECD countries. However, they also find that the poorest are hit by high unemployment. An excess labour supply keeps wages down for the most unskilled jobs.

Other suggested macroeconomic factors which negatively impact income distribution, include the notion that a shrinking of the industrial sector and an expanding service sector increases inequality (Levy and Murnane, 1992), as specialized industrial skilled workers transit to low paid unskilled jobs. Boyd (1988) and Milanovic (1994) suggest that a large public sector reduces income inequality, as wage transfers from the government have an equalizing effect. Lee (2005) finds that a large public sector may initially have the reverse effect of increasing inequality by the government favouring certain industries and elites over others.

1.4.2 Education

Demographic causation of income distribution has gained much prominence within the literature. Perhaps the most prominent of these are the studies carried out on links between inequality and education. It has long been established that more education tends to increase the *levels* of future income (Schultz, 1961); (Gregorio and Lee, 2002a). More recently, Stewart (2009) contends that inequality in access to education affects the future income of households.There is also a consensus on the general “positive economic returns to education” (Salverda et al., 2011, p. 427). However, the link between education and income distribution is more complex. For instance in a cross-country study Schutz et al. (2008) find that family background (the initial economic wellbeing of a household) affects the

educational performance of the children. This can reinforce existing inequalities and cause entrenchment or even a worsening of the prevailing income distribution (Machin and Vignoles, 2004). Related to this, is the prospect of a highly subsidized higher education system at the cost of primary and secondary education. This can lead to negative income distribution outcomes (Tilak, 1989). Indeed, a Kuznetsian inverted U shaped relationship between educational attainment and inequality has been suggested (Cornia and Kiiski, 2001). Tilak (1989) even recommends that “Education planners should aim at shortening the period of transitional increase of inequality to the extent possible.” Clearly, while there is acknowledgment that education may help to reduce poverty and increase absolute levels of income, although even this is disputed when the quality and scalability of education is poor, see (Wedgwood, 2007), its relationship to the *distribution* of income is more uncertain.

1.4.3 Health

The negative relationship between poverty and health is established in the literature, with causality running both ways (Gupta and Mitra, 2004, Salway et al., 2007, Anand and Ravallion, 1993). The very poor often do not have sufficient access to health care and the very unhealthy have insufficient access to income streams. The linkages between health and inequality are however more indeterminate. Although our concern is with health as a determinant of inequality rather than as an outcome of it, most studies adopt the reverse hypothesis. For instance, Kawachi et al.(1997) link higher income inequality in societies to higher mortality and lower social capital. The theoretical mechanisms explaining the impact of health on inequality relate to access to labour markets, education, social networks and marriage. Marriage being significant as this will affect the total ‘household income’ if equivalence scales are not used to account for household numbers. However, looking at a large number of empirical studies on causal links between health and income inequality Leigh et al. (2009, p.24) conclude no “statistically significant relationship either across

countries or over time." This is not to say that there is no relationship between the two, as linkages could be unique (positive or negative) to each specific economic, social or geographic setting. Lynch et al. (2000) also attest to no simple relationship between health and inequality and suggest complex structural mechanisms determine how one affects the other.

1.4.4. Age, ethnicity, gender

Many other demographic factors such as gender, ethnicity and age have been put forward as determinants of inequality. For instance older and younger age groups have relatively lower incomes (Midwinter, 2006). There is considerable literature on the augmenting effect of ethnic diversity on income inequality (Lazear, 1995, Borjas, 1999, Malan, 2000, Robinson, 2002) although there are dissenting voices such as (Shi and Sai, 2009) and (Sullivan, 2011). These studies characterize the role of ethnicity in terms of language diversity (Lazear, 1995), networking and role models within communities (Borjas, 1999), race (Malan, 2000) and relate the concept of ethnically diverse countries experiencing relatively more inequality (Robinson, 2002). Alesina and Glaeser (2004) report attitudes to race as one of the main determinants explaining the high inequality in the US as compared to Europe.

The most glaring inequality is perhaps the one between men and women. Despite high inequalities in developing nations, perhaps due to data availability, gender inequality studies have been more prominent in developed nations. Apart from the commonly cited pay gap between men and women, Gregory (2009) outlines a number of other major areas where gender can affect income distribution. These can be in employment participation with social and legal barriers preventing women from applying for jobs. The particular occupations women enter into, and have easier access to, can also have a bearing on income distribution as different industries and employment sectors offer different pay rates. Male and female earnings tend to diverge from the typical woman's child bearing and child caring age, with men earning more as they become older. This is referred to as the "motherhood penalty" or "family gap" (Gregory, 2009, p.293). Then there is gender bias in promotions and job assignments. Bias in other areas such as education and health can also contribute to inequality in the job market. One of the overlooked gender inequalities is in the household itself. Most inequality studies (as with this thesis) use the household as the

ultimate micro unit of measure. This means that within inequalities, between men and women or adults and children in the household itself are overlooked and not accounted for.

1.4.5 Horizontal and regional inequalities

Horizontal inequality deserves attention from a policy standpoint as it can highlight income differences among sections of society which may need to be addressed by a targeted approach and cannot be rectified sufficiently by a broader policy drive designed to reduce vertical income inequality. A good example demonstrating the need for a distinct policy approach can be highlighted by the experience of South American nations vis a vis their indigenous populations (Thorp et al., 2006). Without the existence of targeted policies for these indigenous groups, they would have simply been side-lined in a more general national drive for reducing inequality. It also follows that reducing horizontal inequality is sometimes the most efficient method of reducing vertical inequality or indeed meeting another broader economic objective. Stewart (2001) points to the tackling of unemployment in South Africa by focusing on black youths for example.

The significance of intra-provincial inequalities (inequality within provinces) has gained prominence recently, especially in relation to studies on China (Gravier-Rymaszewska et al., 2010, Lin, 2009, Long and Ng, 2001). Essentially this is a study of vertical inequality but at a more localized level; the comparison of these vertical inequalities across the provinces allows us to define it as a horizontal inequality. As well as finding out the income distribution of a particular province, these inequalities are also identified in research studies in order to assess the rate of provincial growth on the local welfare of the population.

Studies looking at regional conflict also factor in intra-provincial inequality, although this is combined with other factors to determine its significance. For example, Stewart (2000a) argues that a low level of inequality may lead a region to be more politically united in

conflict, but a high level of intra-provincial inequality may also be exploited by local leaders to drive home the message of conflict with other groups.

1.4.6 Political economy of inequality

Apart from horizontal inequalities, other political aspects of inequality have also received attention in the literature. These can be viewed from three perspectives. One approach has been the study of voting patterns, taxation and the electoral system itself and their effects on the income distribution. For instance Huber and Stephens (2001) find that federalism leads to less national social spending, with targeted local expenditure being preferred. Similarly, Persson and Tabellini (2003) report that constitutional structures affect distribution policy. They find that proportional representation (PR) leads to more national redistribution than the single past the post system of parliamentary elections which favour localized spending. Milesi-Ferretti et al. (2002), in an empirical study, find that purchases of goods and services (such as schools and hospitals) which are easier to target geographically are preferred in first past the post systems. Proportional representative systems prefer transfers (subsidies, pensions) which “are easier to target across social groups”. Iversen and Soskice (2006) confirm that to a large extent electoral systems determine redistribution policy, with coalition governments (arising mostly from a PR electoral system) favouring more national redistribution. Looking at the determinants of the stark difference in inequality between the US and Europe, Alesina and Glaeser (2004) cite political and legal systems as one of the main contributors. Summarizing a whole series of such studies, McCarty and Pontusson (2009) conclude that democracy in itself is not enough to eliminate or substantially reduce inequality. Different political makeups lead to varied patterns of income distribution. This becomes even clearer if the overall inequality measure is disaggregated.

Research on electoral systems and inequality is closely related to the taxation system. More progressive taxation systems are assumed to be equality enhancing. However, in advanced democracies it is argued that the income distribution itself will determine tax policy (Voitchovsky, 2009). This relationship between the distribution of income and voting is not straightforward. For a start “the pivotal voter may not correspond to the median voter” (Voitchovsky 2009, p. 556). The decisive voting block may lie elsewhere in the distribution due to other factors and not be determined purely by the tax regime. For instance redistribution systems which are universal and also benefit the middle class may lead to more progressive taxes and more redistribution. This leads us to the literature on the role of the welfare state on inequality.

The welfare state plays a dual role of what can be termed horizontal and vertical redistribution. Horizontal distribution, in the form of social insurance programs, aim to smooth life time income for all and is typically earnings related (Hills, 2004). Vertical distribution in a welfare state aims to redistribute income from the rich to the poor. Although it must be noted that our primary concern is with inequality; a modern welfare state may have other purposes than merely redistribution of current income McCarty and Pontusson (2009), such as re-training and education (although this can be argued to be another form of horizontal distribution). Countries with more vertical distribution would be expected to achieve a bigger reduction in inequality. However, this is not generally found to be the case. In fact Korpi and Palme (1998) argue that rather than having fixed benefits targeted at low income groups, welfare programs should be more universal and earnings related to ameliorate inequality. In a cross-country study of eleven OECD countries, they find that this approach is more likely to achieve gains in poverty reduction and more equal income distribution. They note that well established social insurance institutions (horizontal distribution) are crucial as the mechanism of lowering inequality. This ‘paradox’ as they describe it, is due to less universal support for the welfare state in countries which focus on vertical distribution rather than benefits for all. This inevitably leads to a lower welfare budget

with less of an impact. Social insurance programs are also assumed to provide more of a working incentive to attract people to the labour market. The effect of welfare programs and social provisions cannot be assessed in isolation in regards to inequality. Social composition plays a large role in the effectiveness of redistribution by a welfare state (Esping-Andersen and Myles, 2009). For instance lone parenthood in the UK and USA is more prominent among low-educated women than other countries. Hence egalitarian commitments may require different mechanisms for achieving the same objectives. It must be noted that the studies outlined so far relate to advanced democracies. The role of the welfare state and more generally the public sector is less certain in developing countries. Indeed, Lee (2005), in a large cross-country study, finds that large public sectors worsen income inequality in non-advanced democracies, and improve it in fully fledged democracies. This he suggests is due to non-democracies favouring partisan groups closer to the administration.

Related to this is a literature family which considers a specific set of unsustainable policies termed ‘economic populism’, where “the redistributive objective is the central part of the paradigm” (Dornbusch and Edwards, 1991, p.9). Populism is defined by Dornbush and Edwards (1991) as a set of policies which have a mandate from a large section of society but end up hurting the majority, with the groups they were supposed to benefit the most experiencing the worst repercussions. Usually attributed to Latin American nations, these policies start with radical initiatives to increase growth, generate employment and redistribute income. They arise from ‘populist’ concerns of a stagnant and unfair economy. Referring to populist economic policies in reaction to such concerns, Sachs (1989, p.30) contends that the level of inequality brings about a demand for redistribution,
“The income distribution in Latin America is a reason for moral concern and a provocation to action.”

Such populist policies are not constrained by inflation targets, preserving foreign exchange reserves or avoiding deficits. Populist economics also arises in nations with weak political institutions, where politicians are perceived as being part of the ‘rich elite’ and

paying only lip service to income re-distribution. This atmosphere gives rise to an administration which initiates policies to demonstrate that they represent the “common man” and that they are not in the “pockets of the elite” (Acemoglu et al., 2013, p.2).

By increasing real wages, the demand for goods and services grows. Higher growth and income redistribution vindicate the populist economic policies. Bottlenecks on the supply side, the running down of foreign exchange reserves from imports, and rising inflation soon lead to an economic crisis. This tends to result in a devaluation of the currency and reduction of subsidies. The devaluation causes massive capital flight running down foreign reserves further and negatively impacting investment and growth (Dornbush and Edwards 1991). This results in a severe real wage decrease, undoing the initial primary objective of income re-distribution.

1.5 How Iran fits into the inequality literature

Before we delve into inequality studies on Iran, it is worth considering how the economic inequality determinants mentioned so far, namely, growth, macroeconomic indicators and demographics factors relate to inequality in Iran. Our contention is that none of these determinants satisfactorily explain the constant and consistently high inequality witnessed in Iran over the past decades.

As we will see in the subsequent chapters, ever since inequality figures were compiled for Iran, they have been high and they have remained consistently high. There is no consistent pattern of a fall, rise or a Kuznets inverted U shaped curve during the last four decades, despite rising, falling and then rising GDP/capita figures. In chapter four of this study, we find no evidence of an inverted U shaped inequality curve in a time-series study for Iran, and similarly in chapter six we find no cross-regional evidence for such a relationship.

Crucially, the Kuznet's mechanism for income inequality falling[4] is reliant on the idea of urban surplus labour being absorbed into the economy and wages rising. It is also reliant on the idea of migration from a relatively equal rural to a more unequal urban sector (Kuznets, 1955, p.7-8). However, this is not the case in Iran on both fronts. The rural sector exhibits almost comparable inequality to the urban sector as we will see in chapter four. Surplus labour in Iran has also persisted post revolution (the average unemployment figure for the period under study 1997-2009 has been above 12.5%[5]). Karl (2004, p.13) draws attention to the prevalence of "under-skilled and underemployed workers" in the urban sectors of oil economies. This is supported by Cornia and Kiiski (2001) who suggest that countries well endowed with natural resources tend to have greater inequality because of capital-based technology and a lower need for unskilled labour. The argument is that the urban supply of underskilled labour is never effectively absorbed into the economy. Thus the mechanisms for Kuznet's inverted U shape do not exist.

Similarly demographic factors do not explain the consistent inequality in Iran. The post-revolutionary government has substantially improved literacy rates and extended the availability of higher education across the country (Majbouri and Salehi-Isfahani, 2008). The specific effect of education as a variable on income inequality in Iran has not been studied extensively and we should be cautious of commenting on its various dynamics; apart from commenting that despite considerable educational improvements, overall national income inequality seems to have remained consistent for the past four decades. Indeed, over 25% of the unemployed in 2008 are reported as having a higher education degree by the SCI.[6] Similarly, there has been a considerable extension of health care services in Iran during both the pre and post-revolutionary period (Jafari et al., 2010). As we will see in chapter six,

[4] After an initial growth period of augmenting inequality has led to a certain income per capita being reached.
[5] Source: World Bank
[6] See the '1387' summary statistics for Iran in www.amar.org.ir. The figures also show the unemployed enjoying a higher literacy rate of 97% as opposed to 87% for the employed population.

although ethnic income inequalities in Iran still persist, in the most part they seem to be falling.

The effects of gender on overall inequality are much harder to gauge given the lack of data regarding the distribution of expenditure and income within households rather between households. However, given the legal and social barriers facing Iranian women, anecdotally at the very least, one can attest to gender bias affecting inequality. For instance, Iranian women are legally barred from certain occupational posts and in terms of wealth inheritance are disadvantaged in relation to their male counterparts. Nevertheless, this does not explain the consistently high income inequality both before and after the 1979 revolution.

The political causality literature on inequality is perhaps more apt in Iran's case. The literature on voting systems is difficult to relate to Iran's electoral system, given the very restricted and 'unique' elective process in the country. However, the choice of a central rather than a federal system of governance has implications for regional, ethnic and national inequality patterns. Iran's sensitivity to potential internal conflict has its roots in the relatively recent notion of a centralized administration in its modern history. A series of political and military measures were instituted by Reza Shah Pahlavi in the 1930s to integrate and suppress ethnic independence aspirations and to direct national economic development by direct central rule over the provinces. During the past 80 years this central administration has been tested repeatedly from small insurrections to complete regional declarations of independence (Khorshidi et al., 2010). Each time the central government has reacted by asserting its centralization instincts rather than being tempted by a federal ideology. This characteristic of the central government's outlook towards the provinces has not shifted during the past 80 years.

This political preamble is significant as it highlights the sensitivity of the government in Tehran towards perceived inequality between the provinces and in particular ethnicities. In effect, one of the repercussions of central economic control over the provinces is the implicit obligation by the ruling administration to ensure a degree of equality between them. A

liability which would perhaps not exist, if economic power and planning was put in the hands of the provinces themselves. This also allows the central administration to engage in wider scale universal national redistribution schemes such as subsidies and price controls, rather than focusing on local regional projects.

Regional inequalities in Iran, as we will see in chapter six, are very high, but on disaggregation, the empirical analysis will show that they account for a very small proportion of overall inequality in Iran. There is also no sign of overall convergence between the provinces.[7]

The 'populist' label given to President Ahmadinejad's government 2005-2013 may lead to a notion of populism being behind the inequality pattern prevailing in Iran during this period. However, although there are certainly elements of populist economics apparent in his administration's policies, they are not fully in line with populism as defined by Dornbusch and Edwards (1991). For a start the initial conditions of widespread poverty and stagnation did not exist before his presidency. As Salehi-Isfahani (2008) points out during Khatami's administration, preceding Ahmadinejad's presidency, the growth rate was positive and stable, and the poverty rate had fallen substantially. The urban poverty head count ratio fell steadily from 0.3 to 0.1 (Salehi-Isfahani 2008). The inequality rate was high, but it had not increased.

An extensive subsidies and price control regime was already in place before Ahmadinejad's term in office, and their existence was not due to a new wave of populist policies. The move to remove such subsidies is chronicled in populist economics literature as coming about due to a fiscal crisis (Dornbush and Edwards 1991). However, in Iran's case the decision to remove subsidies came about before any fiscal crisis. Indeed, (Guillame et al. 2011, p. 8) in the chronicling of the subsidy reform program in Iran, state that the removal of subsidies was not intended to nor "expected to contribute to fiscal consolidation". There is no doubt that the global financial crisis in 2008 and the subsequent recession, as

[7] Although there is a sign of slight urban convergence and considerable rural divergence. But the net overall effect is no convergence.

well as the imposition of sanctions by the UN security council added a sense of urgency to remove the subsidy regime, but it was not the cause nor trigger of their removal. In fact as we will see there is a fall in inequality in 2008 due to negative growth, before the subsidy reform program.

The extensive compensatory cash payment scheme which came into being in lieu of the removal of subsidies can be viewed as an exercise in populism. These payments would represent a substantial portion of income for the very poor. The direct receipt of cash payments would perhaps in the short run at least also increase the popularity for a government rather than the more indirect nature of subsidies. Nevertheless, it must be recognized that any removal of universal subsidies would require some type of targeted financial compensatory payment. Viewed from this perspective, such direct financial payments could be argued as being a first necessary compensatory measure rather than a pre-determined populist one.

A common symptom of engaging in populist economics is eventual forced currency depreciation. The Iranian Riyal's sudden and substantial depreciation in 2012 seems to fit this model. However, it must be remembered that the Iranian Riyal has been in a state of depreciation ever since the Islamic revolution of 1979. The recent currency depreciation, while inevitable, was also triggered by the sudden loss of oil revenues due to international oil sanctions.

While there are undoubtedly strands of populism present in President Ahmadinejad's reign, they do not in themselves explain the income distribution prevailing in Iran and the failure to bring about a trend of falling inequality. Furthermore many of these populist strands have been prevalent both before and after Iran's 1979 revolution and are not exclusive to President Ahmadinejad's government. This leads us to take a look at the historical context of inequality in Iran.

2.0 Iran, income inequality and the rentier state

2.1 Introduction

This chapter begins by calling attention to the significance of vertical and horizontal inequalities in Iran. Despite the lack of emphatic research, clues point to considerable regional disparities and a consistently high level of national inequality. The need for research in this field is made all the more compelling in Iran's case due to the distinct ethnic and cultural inter-provincial differences.

A critique of the existing approach in explaining the consistently high levels of income inequality in Iran is provided. The major criticism put forward is a tendency by researchers to look upon the subject with a post-revolutionary mind-set and give rise to literature dominated by the evaluation of the Islamic regime's economic performance rather than investigating national and regional inequality in their own right. Hence, the existing research suffers from a tendency to ignore the significant structural consistencies that have persisted in the Iranian economy both before and after the revolution. In short, a habit of looking at what has changed rather than what remains the same.

Finally, we hypothesize that the best explanatory factor for the consistently high level of vertical inequality and vast regional disparities is the Iranian economy's major reliance on external revenue from oil exports. We argue that despite the best efforts of administrators to bring about more equitable income distribution, as long as government revenues do not derive from domestic productive processes, vertical and horizontal income inequalities will persist at consistently high levels. In this endeavour, we bring together rentier, vertical and horizontal income inequality literature.

2.2 Historical and contemporary context

Iran's policy makers have glaringly waved the dual flags of economic and regional equality for at least the past five decades. The 1963 White Revolution is an example of a collection of mostly land reform policies which, outwardly in any case, aimed to tackle both issues (Doroudian, 1976). The motivation and the blueprint of the White Revolution reforms have been criticized (Mahdavy, 1965) but at the very least these redistributive policies clearly demonstrate the need for central government *to be seen* to be tackling inequality in the eyes of the public. Despite these reforms, consistent national income inequality and "considerable variations in regional expenditure inequality" (Pesaran, 1976, p. 277) persisted up to the late 1970s (Pesaran and Gahvary, 1978). Indeed some observers claim that the populist 1979 revolution materialized due to increased economic inequalities and the disengagement of the rural populace (Muller and Seligson, 1987).

It is therefore no surprise that the post-revolutionary constitution makes explicit references to tackling economic inequality. A distinct article in the constitution is dedicated to regional economic parity [8] and the role of the economy is described by the constitution as a means, not an end. An egalitarian Islamic economy is what the founders of the revolution had in mind (Behdad, 1994). Emphasizing Islam, it is made manifestly clear that the ultimate aim of the economy is not the "concentration and accumulation of wealth and maximization of profit" but the overall growth and development of each individual.[9] Although historic

[8] Article 48 "There must be no discrimination among the various provinces with regard to the exploitation of natural resources, utilization of public revenues, and distribution of economic activities among the various provinces and regions of the country, thereby ensuring that every region has access to the necessary capital and facilities in accordance with its needs and capacity for growth." The Constitution of the Islamic Republic of Iran, Bern University, International Constitutional Law, http://www.servat.unibe.ch/law/icl/ir00000_.html

[9] "In strengthening the foundations of the economy, the fundamental consideration will be fulfillment of the material needs of man in the course of his overall growth and development. This principle contrasts with other economic systems, where the aim is concentration and accumulation of wealth and maximization of profit. In materialist schools of thought, the economy represents an end in itself, so that it comes to be a subversive and corrupting factor in the course of man's development. In Islam, the economy is a means, and all that is required of a means is that it should be an efficient factor contributing to the attainment of the ultimate goal." The Constitution of the

constitutions of most nations are perhaps befittingly idealistic in nature, in Iran's case this is a constitution drawn up barely three decades ago by the founding fathers of the modern Islamic regime. Its chapter on the economy reads as much like a party political manifesto of policies to be implemented as it does a long-term legal framework. Indeed, in line with the constitution, shortly after the revolution wealth redistribution began in earnest (Behdad, 2000) with economic planning grounded in socialist ideals (Salehi-Isfahani, 2006a).

After thirty years these foundational objectives have not been abandoned. President Mahmoud Ahmadinejad came to power on an electoral mandate of improving wealth distribution[10]. This mantra coupled with the numerous highly publicized visits of the President to the provinces[11], are testament to the rhetoric of equitable wealth distribution and regional homogeneity which reside enduringly, side by side, at the heart of Iran's post-revolutionary economic doctrine. As Salehi-Isfahani (2008, p. Abstract) aptly puts it "Despite nearly three decades of revolutionary government rule, poverty and inequality remain the central issues of political debate in Iran."

2.3 Consistent income inequality

Given the prominence of an egalitarian society at the heart of Iran's official economic discourse, it is perhaps surprising how little research has been published on national and regional income inequality in Iran. As this vast territory of research remains mostly unexplored, the few existent research publications have, understandably, initially focussed on the invaluable 'headline' indicators.[12]

Islamic Republic of Iran, Bern University, International Constitutional Law, http://www.servat.unibe.ch/law/icl/ir00000_.html

[10] See for example "Ahmadinejad to focus subsidies on Iran's poor", 2008 Reuters, http://www.reuters.com/article/newsOne/idUSBLA54169320080625

[11] "President Wraps Up 21st Trip", Iran Daily Newspaper, Number 2710, Saturday November 18, 2006

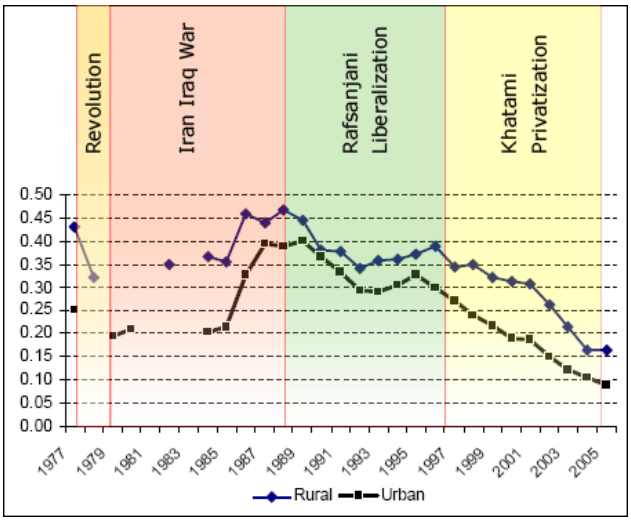
[12] For example Assadzadeh and Paul (2004) look at 3 particular years and derive national poverty figures as well as decomposing the figures into occupations and large geographic regions (not provinces). Salehi-Esfahani (2008) derives national poverty and income distribution figures for rural and urban areas as a whole. Tabibian's (2000) detailed study, on poverty in particular, provides

Two of the most comprehensive empirical studies on income inequality in post revolutionary Iran find that despite a steady fall in poverty after the Iran-Iraq war in 1988, household expenditure inequality has remained fairly consistent; estimated on average to be above 0.40 on the GINI index[13] (Salehi-Isfahani, 2008, Tabibian, 2000). As expenditure is used to approximate for income, and given the higher proportional savings of the very rich to the very poor, income distribution may even be more unequal in Iran. When it comes to comparing the very poor with the very rich, studies find that since the mid 1990s the poorest decile have gained in expenditure share relative to the richest decile (Salehi-Isfahani, 2006b, p.25, Tabibian, 2000, pp.152-158), however the overall rate of income inequality has more or less remained constant. There is also a general consensus that income distribution became slightly worse during the years of 1991-1992 when war rationing was ended and many consumer prices were left to be decided by the market (Salehi-Isfahani, 2006b, Tabibian, 2000, Assadzadeh, 1997, quoted in Assadzadeh and Paul 2004 p.645).

household characteristics of poorer families, effects of subsidies on those families and is much more policy oriented.

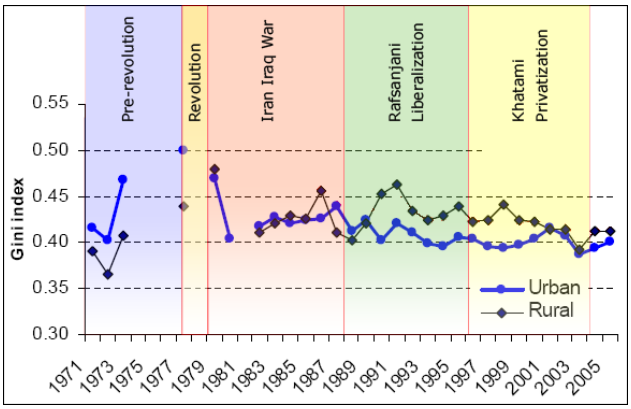
[13] The latest national GINI index measure published is by Salehi-Isfahani (2008) for the year 2005.

Figure 2.1.1 Iran poverty headcount ratio as calculated by Salehi Isfahani, 1977-2005



Sources: Poverty Lines from Assadzadeh & Paul (2004), 1977-1983 (SCI Publications), 1984-2005 Salehi Isfahani, Compiled by Salehi Isfahani without the timelines (2007)

Figure 2.1.2 GINI Index, inequality of household expenditures Iran 1971-2005



Sources: 1971-73: Pesaran (1976); 1977-83: Behdad (1989); 1984-05:Salehi-Isfahani using Household Survey Data, Compiled by Salehi Isfahani without the timelines (2007)

This high level of consistent inequality at first appears unexpected given the vast array of revolutionary redistribution efforts over the past three decades. There is a very sharp but short-lived decline in inequality immediately after the revolution. This seems to suggest that nationalizations and the forceful initial expropriations of income bearing assets from those deemed to be closely associated with the pre-revolutionary Pahlavi regime (Behdad, 1989) and their redistribution to other sections of the community, lower on the

income ladder at that time, has had the most noticeable effect on lowering income inequality. This is in line with Stewart's (2000b, p.10) assertion (but not recommendation) that only "very radical action involving asset redistribution" can lead to a significant short-term fall in income inequality. Salehi-Isfahani (2008) conjectures that the sudden fall in post-revolutionary inequality may also be due to the high income bias in the large wave of Iranians fleeing the country.

Both explanations are facets of what Nomani and Behdad (2006, p.33) term post-revolutionary "Structural Involution", a structural change resulting from a "postrevolutionary [sic] economic crisis". Putting income distribution studies on Iran and the literature on post-revolutionary structural change side by side, it can be argued that the only dramatic decrease in national income inequality has come about, for only a brief period, at the very beginning of the Islamic Revolution, due to the disintegration of the pre-revolutionary economic structures. Post-revolutionary policies since that time have not noticeably decreased overall income inequality.

2.4 Persistent regional disparities

Studies also point to substantial inter regional disparities. Assadzadeh and Paul (2004) find large differences in the poverty head-count ratios between various geographic regions in Iran for the years of 1983, 1988 and 1993. For example in1993 the head-count poverty ratio for Southeastern Iran is given as 0.513 and Northern Iran as 0.250. A report by the United Nations and Iran's Budget and Planning Organization (1999) provides Human Development Index (HDI) figures on a provincial basis. These highlight vast regional variations. In the most extreme example Sistan and Baluchestan has a HDI figure of 0.54 to Tehran's figure of 0.84. Tabibian (2000) finds that in 1997 the average annual household expenditure in

Tehran was more than double the expenditure in Sistan and Baluchestan province.[14] (Sharbatoghlie, 1991) provides numerous urban, rural, provincial and inter city development measures to indicate an unequal economic map of Iran. Hence, as with vertical inequality, considerable regional horizontal inequalities have also persisted post revolution.

2.5 Significance of inequality in Iran

The significance of high national vertical inequality on economic growth (Deininger and Squire, 1996, Kuznets, 1955) and on a whole host of social well-being indicators grouped loosely under the term 'social capital' (Kawachi et al., 1997) has been extensively debated by the literature. It is not the purpose of this study to cover the debates on the consequences of vertical inequality. However it is worth mentioning two specific lines of argument that relate to Iran.

Empirical studies on Iran seem to indicate a downward trend for poverty, but consistently high-income inequality. However, as Ravallion (2001, pp. 17-21) concludes in his study of 50 developing countries, high income inequality impedes the poverty reduction consequences of growth. In order for the Iranian government to reach its millennium and fifth development plan goal of eradicating poverty[15], more attention has to be paid to income inequality.

An additional argument is that high income inequality in Iran has contributed to the stagnation of the manufacturing sector. Karshenas (1990, p. 204) describes the process of how high income inequality in the 1970s led to a "branch economy". This builds on the idea that numerous small production units will supply a small "luxury market" created by a lopsided consumption pattern. "The characteristics of income distribution never allowed the market for new manufacturing products to become a mass consumption market" (Karshenas, 1990, p.203).

[14] Tabibian (2000, pp. 54-55) gives a figure of 17,416,755 Riyals average annual expenditure in 1997 for a household in Tehran and a figure of 7,556,950 for Sistan and Baluchestan province.
[15] See http://www.undp.org.ir/poverty.aspx for more details

The significance of inter and intra-regional inequalities for economic development has gained considerable recognition recently (Azzoni, 2001, Arbia et al., 2005, Kanbur and Zhang, 2005, Puga, 1999). Stewart (2001) concludes that horizontal inequalities can have severe consequences for economic development. These consequences are amplified if the inequality is between distinct "culturally defined groups" (Stewart, 2001, p.3). Although relations between Iran's ethnic communities are in the most amicable (Mostofi and Afary, 2008)[16], it is significant that most of the poorest provinces are culturally and ethnically distinct. The bottom three provinces in the UNDP (1999) Human Development Index report for Iran are Sistan & Baloochestan (Balooch ethnicity), Kurdistan (Kurdish ethnicity) and Kohgiluyeh Boyer-Ahmad (mostly Lurs/Bakhtiaris).

As well as carrying out a study of national vertical inequality in Iran, we will also disaggregate the data on a provincial basis. Official pronouncements in Iran cite "Tehran", a primate city, by its own name but sum up the names of all other cities by the single word "Shahrestan". This is an innate recognition, within Iranian society, of a gap between the capital city and other regions. However evidence also points to significant inequalities amongst the "Shahrestans" themselves (Assadzadeh and Paul, 2004, Sharbatoghlie, 1991).

Intra-regional inequalities are also recognized as being significant in determining regional policy, and any policies designed to improve inter-regional inequalities should take into account its effects on intra-regional equality (Reuter, 2004, Stewart, 2005, Stewart et al., 2009).

Østby (2006) carries out a survey of 55 developing countries for the risk of conflict related to horizontal inequalities and finds "that what is required to secure peace in developing countries is the combination of politically and economically inclusive government." Therefore, the study of the extent and evolution of regional disparities in Iran should be significant for future economic development policies and national political stability.

[16] Although, it is interesting to note that one of the main terrorist threats to the Iranian government is from Jundallah, with a small support base in the poorest province of Iran, Sistan and Baluchistan. For more informatoin http://en.wikipedia.org/wiki/Jundallah

Deriving a pattern of functional inequality in Iran is also significant as it may provide clues to fluctuations and consistencies in vertical inequality. Immediately after the revolution, Behdad (1989, p.337) refers to a considerable shift in income distribution "in favour of wage and salary workers" in the urban economy. Interestingly, this is during the same period that Salehi-Isfahani (2008) reports a considerable improvement in vertical income inequality. One could explain the other, and this is in line with short lived income inequality improvements witnessed in populist Latin American administrations, who also improved (but only temporarily) income distribution by considerably increasing wages (Dornbusch and Edwards 1990). We take a brief look at the inequality between public and private sector headed households in chapter six.

2.6 Gaps in income inequality research on Iran

The existing literature has failed to answer the question of high vertical and seemingly high horizontal inequalities in Iran satisfactorily due to both empirical and intuitive gaps in research.

2.6.1 Few inter-regional empirical studies

Empirical research on inter provincial economic inequalities is sparse. Assadzadeh and Paul (2004) look at *poverty* across arbitrary geographic regions[17] within Iran for the years of 1983, 1988 and 1993, but not inter-regional income inequality. Grouping provinces into approximate geographic regions while producing crisper summarized results, suffers intuitively as a number of Iran's provinces display distinct ethnic and cultural characteristics. Valuable insight into their economic prospects will be muffled when averaging out their results with other nearby provinces. Tabibian (2000) and Salehi-Isfahani (2008) provide an

[17] i.e. Northern, Northeastern, Southern etc… rather than the actual provinces. This could have been due to small sample sizes at the provincial level.

urban-rural breakdown for national income inequality but this gives us no clues as to the differences between various regions.

Tabibian (2000) does provide provincial figures for average annual household expenditure, but only for the year of 1997 and without any analysis. Inter-provincial HDI figures for 1996 are published by the 1999 UNDP and Iran's Budget and Planning Organization Report, and they provide some clues into regional income differences for that year, but these are more concerned with 'development' indicators rather than a money-metric measure of inequality.

Perhaps the most comprehensive study of inter-regional disparities in Iran is by Sharbatoghlie (1991). The latest year covered in the study is 1986, two years before the end of the Iran-Iraq war and before Iran's economic revival commenced. The study's focus however is not on income inequality but it is rather an analysis of the general welfare, development and economic performance of the provinces. Najafi and Shooshtarian (2006) look at rural and urban poverty for the year of 2003. The rural-urban poverty gap highlighted in their study hints at regional income inequality. Noorbakhsh (2003), within the convergence literature family, examines inter-provincial average consumption expenditure per capita and average income per capita for the two years of 1991 and 2001. A rural-urban split is also provided. Utilizing provincial population weights Noorbaksh (2003, p.14) concludes "considerable increase in inequality amongst the urban areas of provinces though there has been a decrease in inequality amongst rural areas of provinces." Published provincial averages rather than primary unit data is used in the study and the conclusions are based on only two individual years of data. The focus of the study is on convergence and polarization. The scale of income inequality between the provinces, their ranking in relation to each other and the inequality determinants are not explored.

All the above studies clearly point to large regional disparities in Iran, but as of yet no comprehensive study of these inequalities has been carried out. Numerous crucial policy questions remain unanswered simply due to a lack of empirical research. What is the extent

of regional inequality? Are Iran's provinces converging or diverging? What is their contribution to overall inequality? How much does the urban/rural divide account for observed inequalities? How does this inequality manifest itself among different ethnic groups? This research aims to provide answers to a number of these fundamental questions.

2.6.2 No time series research

The limited data provided by the aforementioned studies also tend to be based on isolated snapshots in time. As we will see later in this study, this approach can be troublesome in a rentier economy which is prone to macroeconomic shocks. There is no evolutionary study of annual regional inequality in Iran pre or post revolution. This lack of a trend, makes it difficult for researchers to arrive confidently at any conclusions regarding the effects of evolving national and regional government policy on income inequality.

2.6.3 No intra-regional analysis

While inter regional analysis can at best be described as extremely limited, published *intra* regional research is possibly non-existent post revolution[18]. Pesaran (1976) reports on pre-revolution intra-regional inequality. He finds that there is some evidence for Kuznets theory of low income inequality for the very poor and very rich regions, and a higher income inequality for middle income regions. To the best knowledge of this author, there is no research paper on the evolution of household expenditure distribution within each individual province post revolution. Again many questions of significance for policy makers and researchers remain unanswered. What is the spread of inequality within the provinces? Does Iran have regions with low inequality? Do the poorest provinces also display the worst income inequality? Has income inequality improved over time within the provinces? Is within

[18] This author has not found any evolutionary study of intra-regional inequalities for the post-revolutionary period.

inequality linked to the rate of growth? Such valuable policy insights may only be gained after comprehensive empirical research, which this study will partialy attempt to address.

The gap in the research is not purely empirical. Let us take an intuitive step back and look at how the few existent studies have approached the topic of income inequality in Iran.

2.7 Existing approaches by the literature to income inequality in Iran

2.7.1 Coupling poverty with income distribution

Income inequality in Iran has received little empirical attention over the past three decades. This is partly due to a genuine lack of available data outside Iran and a misguided notion that economic data sources inside Iran are limited (Salehi-Isfahani, 2006a, p.2). However, another reason for the constancy of income inequality in Iran not being convincingly addressed is the habit of empirical research papers to treat both Iran's poverty and income inequality trends under the same banner[19]. This inevitably leads to income inequality taking a back seat in the discussions and conclusions, ironically enough because of its very constancy.

Whereas, post-revolution poverty in Iran displays up and down trends and is thereby more suited to cause and effect analysis, income inequality remains largely uniform. Apart from observing that "overall inequality in Iran has not been only resilient to policy changes but also to the revolution itself"(Salehi-Isfahani, 2008, p. 33), the underlying reasons for this resilience have not been adequately explored nor explained.

2.7.2 The pre-revolution / post-revolution approach

Given the coupling of high income inequality with poverty and the revolution's aim of eradicating both (Amuzegar, 2005), references to inequality by economists are in the context of evaluating the Iranian regime's post-revolutionary performance rather than assessing the underlying causes of Iran's high and consistent income inequality in its own right. Just because the 1979 revolution aimed to reduce income inequality, it does not follow that we

[19] For example look at the titles of all the three main studies since the revolution:
(Assadzadeh 1997) "Income Distribution and Poverty in Iran"
(Tabibian 2000). "Poverty and Income Distribution in Iran.
(Salehi-Isfahani, D. 2008). "Poverty, inequality, and populist politics in Iran."

should address this issue by investigating what the revolution failed or did not fail to accomplish.

The two most extensive empirical studies on Iran's income inequality highlight policies adopted by the post-revolutionary regime and then judge the effects of those policies on poverty and income inequality (Salehi-Isfahani, 2008, Tabibian, 2000). While this approach is intuitively understandable, the danger is that it can unwittingly paper over fundamentals of the Iranian economy that persisted both before and after the revolution and are to an extent independent of administrative policy. These fundamentals may indeed be more explanatory than post-revolutionary policy when it comes to explaining income inequality and regional disparities. Salehi-Isfahani (2008, p. 29) alludes to this in his own study when commenting on the consistency of income inequality, "A possible lesson from this observation is that, unlike poverty, inequality outcomes are structural and are not easily affected by policy or in this case even a social revolution." Tabibian (2000) also contends that growth, both before and after the revolution, seems to have had an adverse effect on income inequality. This clearly points to some type of structural causation within the economy that has not been remedied by either pre or post-revolutionary administrations.

As already discussed, the data available seems to suggest that despite contrasting socialist and liberal macro policies over the past three decades, income inequality has remained consistently high. Therefore, the danger of focussing on post 1979 policy making is to give both unfair credit and apportion unfair blame to government policies and to ignore more fundamental structures and relations within the economy which have remained immune to the revolutionary zeal.

2.7.3 Iran's post-revolutionary inequality riddle

The question, which then emerges, is why national and inter-regional economic inequalities have seemingly remained consistent despite the revolutionary redistributive policies of the Islamic regime?

Perhaps a more productive intuitive approach to answering our inequality question is not to look at changes, which have taken place before or after the revolution, but to observe what has remained the same. In short, it is in the similarities of the economy present before and after the revolution where we are most likely to find our explanations for consistent and persistent national and regional income inequalities.

If the conclusion of the limited income inequality research on Iran is that post revolution, the rungs of the economic ladder have remained the same and redistribution efforts have simply switched the people standing on them (Behdad, 1989, p.353, Salehi-Isfahani, 2008, p.33), the next question which then needs to be answered is *why* have the rungs of the ladder remained the same?

In this respect two main factors dominate Iran's economy and its regions both pre and post revolution; its reliance on oil, and its vast geography with numerously distinct provincial characteristics. Without jumping to conclusions, before a comprehensive empirical study is carried out, we can at least make a reasonable assumption that it is within this political economy framework, i.e. a framework which applies to both pre and post-revolutionary Iran that we are most likely to find satisfactory explanations.

The political economy question for the purposes of our empirical research is:

Are there inherent characteristics within a resource rich economy which, despite the redistributive efforts of the central government, make it difficult to reduce national and regional income inequality?

In order to develop this framework, we now turn our attention to rentier and regional inequality literature as it relates to Iran, which provide the theoretical underpinnings for this research.

2.8 Vertical inequality in a rentier state

The theory of rentierism, is not so much a theory but rather an observation of economic and socio-political structures that take shape in a country dependent on external sources of revenue deriving from a domestic natural resource. The concept of a 'rentier state' was put forward by Mahdavy (1970) in relation to the growing reliance of Iran's economy on rising oil revenues from the late 1950s. [20] Generalizing Iran's case to other oil-rich economies Mahdavy concluded that "oil revenues received by the governments of the oil exporting countries have very little to do with the production processes of their domestic economies" (Mahdavy, 1970, p.429). Mahdavy compares this to the inflow of gold into 16th century Spain. Sachs and Warner (1995, p.1) in their well known 'resource curse' paper also refer to how "resource-poor Netherlands eclipsed Spain, despite the overflow of gold and silver from the Spanish colonies in the New World". Rentier theory can be looked upon as a special case of the resource curse literature family.

As oil revenues become the major source of revenue for the state and the economy, there is an intuitive transition from a rentier economy to a rentier state, because the government derives its major share of revenue from an external revenue source. These revenues are external to the domestic economy and a very small minority is engaged in their generation, "the rest of the society is only engaged in the distribution and utilisation of this wealth" (Beblawi, 1987, p.51). Notably the government's role becomes solely an "allocative" one (Luciani, 1987, p.70). We will now extend the rentier theory literature into how it may lead to consistently high national and regional income inequalities.

2.8.1 Implications of rentier theory for inequality

A large part of a nation's inequality pattern derives from fundamental structures shaped in the past (Stewart, 2000b), such as the entrenched distribution of capital. In Iran, families,

[20] It is interesting to note that Mahdavy (1970) realized the negative impact of growing oil revenues on the structure of Iran's economy before the major rise of oil revenues in the 1970s.

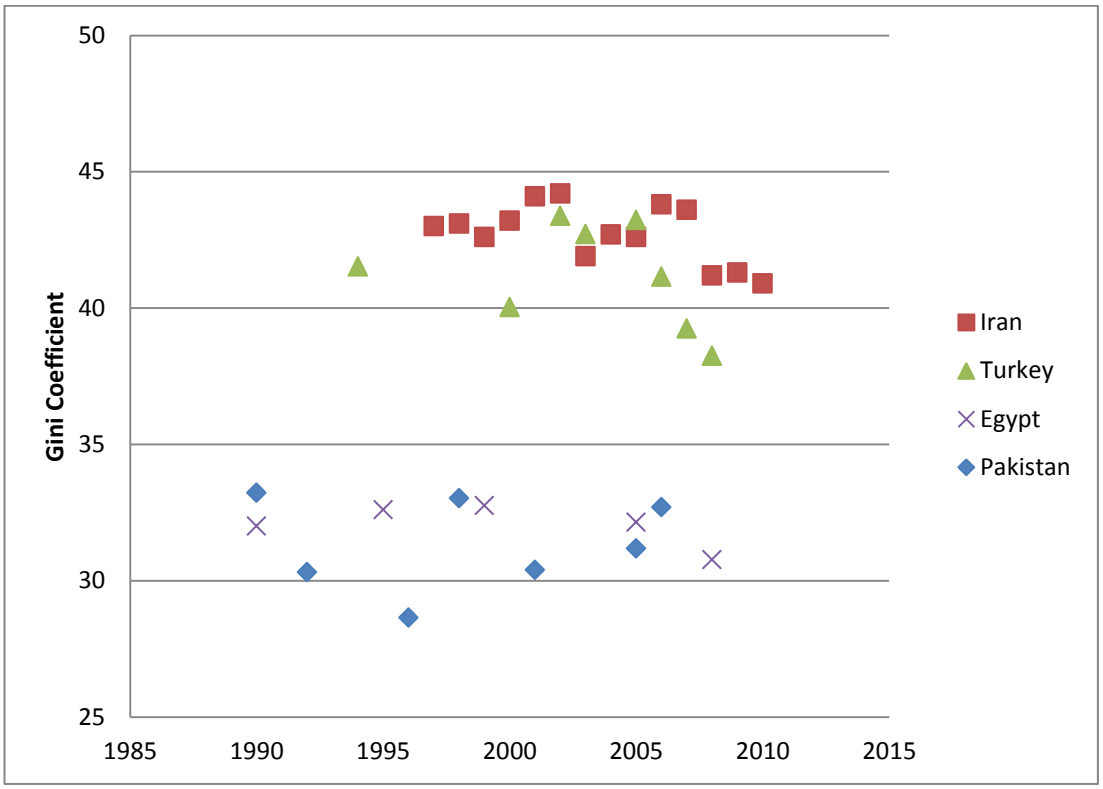
state and pseudo state organizations are still typically the end-nodes of such a distribution of capital rather than private corporations with millions of shareholders (Maloney, 2000). Stewart (2000b, p.10) points out that for most economies unless there is "very radical action involving asset redistribution" major improvements in income distribution should not be expected in the short run.

What is particularly interesting in Iran's case is that despite the very radical asset redistributive policies following the revolution (Behdad, 1994), and over thirty years of encouragement of an equality inducing 'Basiji culture'[21] we find that the level of inequality has still not changed. A forewarning for Iran's policymakers that inequality in Iran is not so easily shifted, should have come from the land reform program of the White Revolution in 1963, which also failed to bring about the desired equality enhancing outcomes (Pesaran, 1976, Mahdavy, 1965). To find an explanation for this entrenched inequality we turn to the fundamental nature of Iran's economy which has been reliant on oil since the early 1960s, a state whose revenue has been dominated by external oil rents.

Although we wish to highlight the rentier implications for inequality, it should be noted that many non-rentier states may have many common structural characteristics impacting on their income distribution. For instance political institutions in the hands of a rich elite or weak fiscal systems are common in many developing countries. Although, the rentier nature of a state may be a barrier to shifting income distribution, its removal is not sufficient in achieving such an objective. In figure 2.1.2b we can see that three non-rentier countries in close proximity to Iran have also not shifted their income distribution significantly. Although in Egypt and Pakistan's case they display considerably less inequality.

[21] See http://www.farsnews.com/newstext.php?nn=13900903000330 (in Persian) on President Ahmadinejad's speech exalting 'Basiji culture' for being able to eradicate income inequality. The term Basiji refers to "Basij-e Mostazafin", meaning the "Mobilization of the Oppressed".

Figure 2.1.2b Gini coefficients, Iran, Turkey, Egypt, Pakistan, 1990-2010



Rentier state theory is not primarily concerned with income inequality, nor does it make any explicit predictions regarding its dynamics, nevertheless in the founding paper on the rentier state, Mahdavy (1970, p.466) succinctly sums up the core problem of inequality in a rentier setting:

"The problems [of income distribution] are more serious in Rentier States because of the concentration of vast external rents in few hands. The temptations for a government bureaucracy to turn into a rentier class with its own independent source of income are considerable."

It is precisely this “independent source of income” accruing to the central state, devoid of linkages with the domestic economy which has numerous implications for vertical and horizontal income distribution.

Gray (2011) provides a critique of classic rentier theory. He argues that phenomenon such as globalization and technological change have affected the Persian Gulf Arab states and that they have entered into a ‘late rentierism’ stage. This is less apparent in Iran where a sustained sovereign wealth fund has not been successfully established, and unlike sheikhdoms such as Dubai, Iran is still heavily reliant on its oil revenues. Furthermore, as far as income inequality is concerned, it is still mostly the political institutions which determine the distribution of economic resources. Hertog (2013, p.2) accepts that Persian Gulf states (GCC) are integrated into the global economy and have established non-oil economic activities but describes much of this late diversification as being “driven by state-owned companies” and describes it as “more sophisticated rent recycling.”

Even Gray (2011, p.37) accepts that in the Persian Gulf “rentierism remains the theory with the most utility and cogency in explaining the political dynamics”. Hence in the case of Iran we can extend the classic rentier theory literature to a non-exhaustive list of implicit income inequality predictions. Nevertheless Gray’s contention remains valid that rentier states have the ability to evolve and modify their nature.

Our contention is that the structure of a rentier state in Iran reinforces a unique set of income distribution dynamics which are not always pulling in the same direction. In the next sections, we peruse the literature investigating the income distribution implications of a number of classic rentier traits, including: fiscal weakness, domination of rentier classes, populist poverty alleviation, shrinking rural sector and provincial inequality.

2.8.2 Weak fiscal setup

Given the consistent inflow of large oil revenues rentier states veer towards subsidies and find it politically hard to introduce strong fiscal tools. Note the unrest in Iran following the introduction of the 2008 VAT tax and the rationing of heavily subsidized fuel.[22] VAT is not even a progressive tax, yet its introduction has been politically opposed by the higher income Bazzaris (traditional merchants). The situation was the same before the revolution, Mehran (1975, quoted in Behdad 1989, p. 333) finds that Iran's fiscal system "had virtually no equalizing effects". This structural caveat in Iran's economy has been present both before and after the revolution. Garaibeh (1987), in his study of the tax policies of Kuwait, notes that taxes are not imposed "simply because revenue is not needed" due to high external oil revenues. Yates (1996, p.36) takes the debate one step further and argues that "engaging in extractive fiscal policy" would be unpopular and would endanger the survival of the powers administrating the rentier state.

Whatever the reasoning, by not having strong fiscal measures in place, rentier states, such as Iran, lose one of their most important redistributive 'power tools' for shaping the pattern of income inequality. In a recent paper, Stewart, Brown et al. (2009) make proposals as to the type of tax measures which should be put into place to alleviate vertical and horizontal inequalities. However, by definition, fiscal measures are simply not possible in a rentier state with very limited fiscal tools, such as Iran.

2.8.3 Rentier classes

Rentier states lead to the formation of rentier classes (Beblawi, 1987, First, 1974, Luciani, 1987, Mahdavy, 1970, Yates, 1996). This results from the almost purely allocative nature of the government, and its administrators playing such a big role in distributing the revenue. These class formations result in persistent structural functional inequalities. As (Nomani and

[22] See "As Economic Unrest Intensifies, Ahmadinejad Backs Down", Fox News, 15th October 2008, http://foxforum.blogs.foxnews.com/2008/10/15/alireza_1015/

Behdad, 2007) note "An important objective of our class approach to the study of the workforce in Iran is the identification of structured inequalities in economic activities." Evidence of the structural nature of these inequalities is the failure of the 1979 revolution to undo these class structures. Initially (1979-1980), extensive nationalization and expropriation of enterprises and individual assets took place. Behdad (1989, pp. 329-333) demonstrates that the new nationalized enterprises, considerably increased wages in real terms among workers and axed many managerial jobs. "Thus, between 1978 and 1981, in the urban economy, the functional distribution of income changed significantly in favor of wage and salary workers and against those who received their income in the form of profit, interest, and real estate rental payments." This corroborates with the very sudden and equally short lived improvement in national income inequality in Salehi-Isfahani's (2008, p.20) study.

However, shortly after "with the *normalization* [italics are this author's addition] process, which started in 1981, the redistributive trend was reversed" (Behdad, 1989, p.337). The implication here is that there is a 'normal' mode of class structure in Iran that is to be expected. In his study of Gabon's oil boom, Yates (1996) argues that through its public expenditure, a rentier state, via discretionary contracts, favourable loans, untargeted subsidies and other rent seeking activities, creates a set of rentier classes in the economy. Public sector administrators and the urban service sector are the principal winners.

In Iran's case, the people in the classes may be different but the pre-revolution class structures return after a short transitional revolutionary period. Tabibian (2000, p.215) finds that rises in the oil price significantly benefit the highest income decile more than any other income group.

To illustrate this point further, let us have a look at the literature on the post-revolutionary trusts setup in Iran with the aim of bringing about better wealth distribution, namely the 'Bonyads'. These 'charitable' foundations were setup to take over much of Iran's expropriated and nationalized assets and industry. Their role was a dual one of development and wealth distribution (Maloney, 2000). Commanding a huge portion of Iran's industrial

capacity (Behdad, 2000, p.112), profits were supposed to be dispensed to the needy rather than 'rich capitalists'. In Maloney's words the Bonyad[23] was "the centrepiece of the Islamic Republic's commitment to social justice and a more equitable distribution of the national wealth" (Maloney, 2000, p.155). In her critique of these foundations, Maloney argues that far from helping Iran's economic development, due to favourable treatment, tax exemptions and political clout, they have managed to "muscle out the small businessman" (Maloney, 2000, p.163). Bjorvatn and Selvik (2008, p.2318), describing the Bonyads as "shadow economic forces", argue that these organizations operate on the basis of patronage and friendships with close associates receiving lucrative contracts.

Thus, as illustrated by the example of the Bonyads, the rentier nature of the state imposes structural functional inequalities despite considerable initial efforts by the government to disrupt such inequalities. In his study of occupational inequalities for the year 1997, Tabibian (2000, pp. 75-76) finds that the higher income deciles are dominated by public sector workers and the service industry, whereas the lowest income decile consists of mainly private sector and agricultural workers. The reliance of Iran's economy on oil rents has significant consequences for inherent functional inequalities.

2.8.4 Globally uncompetitive industry

In her study of the Libyan revolution and the subsequent oil bonanza, Ruth First (1974, p.169) refers to a notion of public policy described as "shooting pigeons with rockets". This is the idea that a rentier state funds projects that may be intended to please rather than to produce. As the state is the main allocator of resources in a rentier state, the temptation for administrators is to choose the populist route. Abdel-Fadil (1987, p.84) finds that during the 1970s oil boom rentier states spent "a sizeable portion of their revenues" on construction projects. Lavish highways, dams and residential housing schemes took precedence over

[23] Maloney (2000) was referring to the biggest Bonyad, the Bonyad-e Mostazafan va Janbazan

industrialization. Construction projects are viewed as being immediately visible and hence populist in nature (Seers, 1978, quoted in Abdel-Fadil 1987, p.84). A booming service sector develops around these rent-funded public works, leading to occupation inequality between workers in services, industry and agriculture.

First (1980) argues that even sectors which use oil as an input tend to be neglected as their production is “highly complicated” and they can simply be imported. See this quote from an official in Iran’s National Oil Company (Stern, 2006), “Given the fact that our refineries are out-dated and that NIOC does not have the necessary funds to build new refineries and that the private sector does not engage in the business of construction of refineries due to the low profits involved, import of gasoline is more economically feasible than building refineries.” The National Iranian Oil Company official is berating the fact that funds are not made available to them for long-term projects.

2.8.5 Helping the poor but worsening inequality

The general consensus is that poverty rates in Iran have dropped since the Islamic revolution (Salehi-Isfahani, 2008, Tabibian, 2000). Economic growth and numerous government policies may be poverty reducing. However, we wish to survey the literature and highlight two specific policies by the Iranian government to improve general welfare, as they are good examples of how despite their poverty reduction attributes, these policies have not reduced and may have in fact increased income inequality.

Yates (1996, p.23) alludes to a mentality by administrators in rentier states which leads them to believe that they “can purchase their development.” He argues that development is often seen as a product rather than a process. Similarly, Ruth First (1974, p.162), in her look at economic administrators in oil rich Libya, asserts, “The idea seems to be that money can buy anything, and that more than enough money can buy everything.”

In essence, blunt direct financial instruments are favoured over the development of productive capacity. One specific policy by the Iranian government has been the use of extensive subsidies on fuel, basic foodstuffs and the utilities to decrease poverty (Najafi and Shooshtarian, 2006). While this will help the poor, Tabibian (2000) in his study of Iran's 1996/1997[24] household surveys finds that the rich, in absolute terms, are benefitting much more from the subsidies than the poor, hence it is a policy measure which actually tends to worsen income inequality. He finds that in 1996, whereas the richest income decile purchased almost 100 litres of heavily subsidized petrol per month, the poorest decile barely purchased 5 litres[25] (Tabibian, 2000, p.93). Tabibian goes on to estimate that the subsidies accruing from fuel to the top income decile is equivalent to the total household budget of the bottom decile. He also finds that the rich are benefitting much more from energy subsidies but not from basic foodstuffs where the benefits are more even. Hence, oil rents in the form of fuel and utility subsidies, while helping to reduce poverty, are accruing more to the rich than the poor in absolute terms worsening income inequality.

The second policy of the post-revolutionary government we wish to highlight has been the encouragement of direct non-financial and financial aid to the poor. Tabibian (2000, pp.127-134) finds that most of the financial aid for the calendar year 1997/1998[26] does indeed reach the poor. More than 37% of direct financial aid reaches the poorest decile. However, the situation with non-financial aid is quite different. Non-financial aid can take the form of basic foodstuffs and household items. The top income decile receives 38% of the non-financial aid compared to 4% for the lowest decile. Whereas financial aid is dispensed via the welfare ministry and charitable organizations, non-financial aid is typically dispensed through public sector companies to their workers. The top administrators having access to first pickings (Tabibian, 2000, p.132).

[24] 1375 in Iran's calendar.
[25] Please note that this figure has been construed from a chart provided by Tabibian (2000) and not from a table.
[26] 1376 in Iran's calendar

The key to the success of such 'welfare purchases' by the state is the selection of appropriate distribution channels. Rentier states tend to encourage a huge role for the public sector and give rise to a top down allocative pyramid. In such an environment, mass subsidies and even some forms of direct aid do not improve and may even worsen income inequality.

2.8.6 Brain drain

It is interesting to note that Iran's economy seems to have been incapable of absorbing much of its newly educated skilled workforce. According to an IMF report (Carrington and Detragiache, 1999) 15% of Iran's tertiary educated population emigrated to the United States and the percentage to OECD countries was 25%. This is a cautionary tale that the failure of the domestic economy to absorb a large proportion of the newly educated population will inevitably diminish positive effects of educational investment on income inequality.

2.8.7 Regional and horizontal inequalities in a rentier state

Before we look at how high levels of inter-regional inequality may come about and persist in a rentier state, it is worth making the point that even in the regions where the oil is generated the local economy does not seem to benefit many of the residents. Mahdavy (1970) noticed a fixed negligible contribution to the local regional economy by the oil industry. What Hirschman (1958) would have termed a lack of "forward and backward linkages". Mahdavy found that increasing oil revenues did not require further inputs from the local economy, nor were there any forward linkages, as there were no domestic upstream industries. Abdel-Fadil (1987, p.84) in his study of oil-rich Arab countries reaches the same conclusion, "linkages between the oil sector and the rest of the economy are very limited in oil-rentier states".

As well as regions, rentier classes control which cultural activities and which ethnicities receive the most funding (Yates 1996). Depending on the allocative objectives, this can improve or worsen horizontal inequalities.

2.8.8 Rural-urban income inequality

Ruth First (1974, p.120), in her study of the Libyan oil boom, puts forward the idea that in a rentier state the usual development process of 'rural to industrial to services' is reversed. Due to the central government's expenditure of oil revenues, the services sector "grows to elephantine proportions." This in turn leads to a rapid process of urbanization and rural-urban disparity.

During Iran's twenty year oil boom from 1956 to 1976, the number of managers in the urban sector grew by 400%, in the rural sector it grew by 13%.[27] During 1959-1976, "the ratio of urban to rural consumption expenditures per capita doubled" (Sharbatoghlie, 1991, p.96). During this oil boom period, Sharbatoghlie (1991) asserts that rural-urban income distribution inequalities took shape due to the inflow of employment, capital and entrepreneurship into the cities. Amirahmadi (1986, p.516) contends that by the mid 1970s the income gap between the rural and urban areas was 8:1. Karshenas (1990, p.228) points out how in an oil economy public sector expenditure in parallel with a large subsistence agricutlural sector will lead to a "worsening distribution of income".

2.8.9 Inter-provincial income inequality

In order to tackle the topic of how a rentier state may give rise to persistent regional inequalities, we briefly turn our attention to convergence literature.

[27] Source: The Statistical Year book of 1966 and 1980, table provided in p.95 SHARBATOGHLIE, A. 1991. *Urbanization and regional disparities in post-revolutionary Iran,* Boulder, Colo., Westview Press.

Convergence literature is focussed on growth and we are concerned specifically with income inequality. Although it is not the intended purpose of this literature review to cover the general literature on regional inequalities and to only focus on inequality as it relates to a rentier state, for the sake of seeing how a rent seeking economy fits into the existing literature family, we will take a brief look at the two main schools of thought on regional inequality.

The neo-classical view of regional inequality is that given perfect factor mobility and perfect competition regional inequalities are temporal and will disappear over time (Williamson, 1965, Solow, 1956). Factor price convergence comes about due to capital and labour mobility, and regional convergence occurs due to diminsihing returns to capital and labour. Williamson's (1965) inverted U shape curve is a 'Kuzentsian' view of regional growth, namely that regional inequalities are low at the beginning of development, reach a peak during the middle cycle, "while mature growth has produced regional convergence" (Williamson, 1965, p.44).

Myrdal's (1957) circular and cumulative causation theory (CC theory) envisages a virtuous circle of capital, talent and higher than average returns accumulating in favoured regions, and a viscious circle of "backwash" effects on the other regions. Although, Myrdal also mentions positive "spread" effects, his argument is focussed on divergence. Similarly, Kaldor (1966, 1970), although with a different CC theory, emphasizes how regional divergence can occur during growth. The current consensus seems to be that of convergence within specific subsets of developed economies (Jian et al., 1996). Sachs and Warner (1995) divide nations into closed and open economies, and find that economies connected by free trade tend to converge, unlike closed economies.

The convergence evidence on regions within developing countries is mixed. The countries most often cited in the studies are China, India, Brazil and the South East Asian

nations[28], none of which can be described as 'rentier states'. However, in China's case, a crucial piece of insight can be gained from the numerous coastal-inland inequality studies, and this is where we find an analogy with the rentier states. For China's 'central planning' implies certain regions may be favoured over others. As Jian, Sachs et al. (1996, p. 4) put it, "Tendencies towards convergence in centrally planned economies would therefore tend to be somewhat accidental in character. Central planners might or might not allocate capital to the poorer regions... However, given the strong lobbying pressures of state enterprises in the socialist system, it is more likely that bureaucratic allocations of physical capital will tend to flow to existing concentrations of state enterprises, rather than to new geographical areas."

Although it would be a mischaracterization to describe Iran as a centrally planned economy (See Salehi-Isfahani, 2006a, p.3), the allocative power of a rentier government makes it the key player in determining the fate of the provinces. Rents may accrue to some prvoinces more than others. In effect, rent seeking if concentrated in particular provinces, can manipulate regional factor mobility and factor price conversion. In the only published study (known by this author) of rent seeking on regional convergence in Iran, Dreger, Rahmani et al. (2007, p.11) use "private sector demand deposits" from bank balance sheets in Iran as a proxy for regional GDP and investigate the effect of rent seeking on convergence. The authors find "the presence of rent-seeking activities seems to weaken the convergence process. The impact of rent-seeking turns out to be higher if there is an increase in government expenditures which provides the opportunity for more rent seeking."

Rent seeking (different from the notion of a rentier state) describes any activity which realizes gains by 'non-productive' behavior (Krueger, 1974, Tullock, 1967). In a rentier state, this may take the form of biased tenders, overpriced public contracts, lucrative import

[28] For a good review of regional convergence literature on China see KANBUR, R. & ZHANG, X. 2005. Fifty Years of Regional Inequality in China: a Journey Through Central Planning, Reform, and Openness. *Review of Development Economics,* 9**,** 87-106. For India, RAVALLION, M. & DATT, G. 2002. Why has economic growth been more pro-poor in some states of India than others? *Journal of Development Economics,* 68**,** 381-400. For Brazil, AZZONI, C. 2001. Economic growth and regional income inequality in Brazil. *The Annals of Regional Science,* 35**,** 133-152, FERREIRA, A. 2000. Convergence in Brazil: Recent Trends and Long-Run Prospects. *Applied Economics,* 32**,** 479-89.

licenses, illegal construction permits, subsidized loans, discretionary grants etc. Our contention on the effects of a rentier state directly on regional income inequality are two fold.

Firstly, rent seeking activities may occur in certain regions more than others. This would be the not-so-accidental 'historical accident' cited in agglomeration literature (Ottaviano and Puga, 1998, p.15) leading to one region having "first nature" advantages over others (Krugman, 1993a, p.129). In Iran's case, Dreger, Rahmani et al. (2007) find that rent seeking activities are concentrated in Tehran. These rent seeking activities draw in talented, educated and entrepreunial people from other regions (Murphy et al., 1993). Businesses agglomerate in Tehran, and "Even many businesses located in other regions are organized from Tehran" (Dreger et al., 2007, p. 10).

Secondly, persistent rents work against spread effects and regional convergence tendencies. That is not to say that the main urban hubs accruing rent may not converge, but that the rest of the non-hub regions may never have a chance to catchup as long as extra rent consistently benefits the hubs. In effect, the "second nature" advantages of these hubs (Krugman, 1993a, p.129), i.e. the concentration of demand, supply and transportation is given an extra boost by more rents year on year. Urban hubs such as Tehran, Karaj, Esfahan, Shiraz, Tabriz, Mashhad (identified as lying in hub provinces by (Farmanesh, 2009, p.22) benefit from capacious annual construction projects[29], whereas as a number of studies point to a lack of investment in inter-regional transport as a major cause of inequality and poverty in Iran's poorer regions (Farmanesh, 2009, Piran, 2000, Sadeghi et al., 2001). Certain provinces stay at the top of the income rankings and others firmly rooted to the bottom. This is indeed confirmed by one of this study's empirical findings in chapter 5 (See figure 5.5.3).

Thus the initial external oil revenues allocated by the government can benefit certain regions over others boosting the rapid growth of certain urban hubs. This inital advantage is

[29] For example, Tehran has the biggest Metro system in the Middle East and all the other urban hubs mentioned i.e. Karaj, Esfahan, Shiraz, Tabriz and Mashhad are constructing Metro systems. The Karaj metro is simply an extension of the Tehran metro.

amplfied as rents attract more rents leaving regions ‘ouside the system’ struggling to catchup.

Two words of caution on using convergence literature to insinuate increasing or decreasing regional income inequality. Firstly, inter-regional convergence may mask differing and divergent *intra*-regional inequalities. If using household surveys as a data source for example, the *average* household income for two regions may be converging but their individual income inequalities worsening. Indeed, according to Puga (1999, p.30), Esteban (1997) finds that while there has been convergence between European Community countries in the 1980s, there has been a “rise in income inequalities between European regions within each country .” Arbia, Dominicis et al. (2005) find a similar result for the EU for the period 1977-2002. Therefore, in our research as well as testing for inter-regional convergence in Iran, we will need to test for the evolution of individual intra-regional inequalities during the same period. Reuter (2004) carries out such a study of *intra*-regional disparities in China. Significantly, he finds considerable variations of intraregional inequality between the various provinces, and that these have a significant impact on inequality as a whole.

The second point to bear in mind when using a convergence approach for a rentier state is that what’s on paper regarding regional per capita GDP differs from real incomes of the vast majority of individuals. As Yates (1996, p.31) puts it, “Perhaps the most highly visible distortion in the rentier economy is the measurement and distribution of income.” Dividing total regional GDP figures by population to arrive at a GDP per capita average will most probably not accurately reflect the per capita income of the population as the “black gold”, as Yates terms ‘oil rents’, is in the coffers of corporations and rentier elites. Therefore the use of expenditure surveys to test for convergence may lead to different results that those carried out by GDP/capita.

2.9 Concluding remarks

It would not be erudite to sum up all the effects and hypothesize the net effect of Iran's rentier nature on income distribution as the factors of influence may differ in veracity both geographically and over time. We can merely point to several overall trends which we would expect to observe based on the rentier literature.

1. **Income inequality is not necessarily linked to growth in a rentier state**

   Incremental growth in a rentier state, in itself, may not have a beneficial or adverse effect on inequality distribution as it is highly correlated with oil revenues. Rentier theory contends that oil revenues have a very weak linkage to the domestic economy. Taken to its extreme, if additional government revenues do not derive from domestic economic activity, then unless there is a deliberate change in policy, the distribution of those revenues will be determined by the existing pattern of income distribution. This contention is to some extent supported by the contradictory research results of the effects of rising oil revenues on income distribution in Iran, with some researchers suggesting a decrease in inequality (Moradi, 2009) and some an increase (Tabibian, 2000).

2. **Sustained inequality**

   Following from point one, as long as oil rents dominate state revenues, it becomes difficult to initiate and sustain a decrease in income inequality. Certain classes will always fight for and have favourable access to rents (Luciani 1987, Yates 1996). While this skewed allocation of resources is unwavering, the weak fiscal system (Garaibeh 1987) and large untargeted subsidies will mitigate any compensatory re-distributional policies. In short, the effects of oil rents overwhelm domestic economic policies in bringing about changes to the income distribution pattern.

3. **Urban/rural divide**

   Horizontal income distribution will be in favour of the booming cities and a significant rural/urban divide will persist. The sectoral bias in favour of the service industry (Ruth 1974), the overvalued currency and the urban bias in government expenditures all contribute to more favourable incomes in urban areas and a shift both in terms of population and income towards the urban sector.

4. **Within urban inequality becomes significant**

   Despite periods of sustained growth, within urban inequalities will persist and increase in proportion. According to rentier theory, oil led growth, may not in itself create long term employment as it has weak linkages to the domestic economy. Urban surplus labour ensures sustained inequality within urban areas (Karl 2004), while the increasing income and population share of the urban sector ensures a rise in the share of urban inequality to overall national inequality.

5. **Fluctuations in inequality determined by the fortunes of the rich**

   As rent seekers are by definition those who end up forming the richer income groups, fluctuations in oil revenues affect them the most and fluctuations in overall inequality are manifested in their plight (Tabibian 2000). Their disproportionately large share of total income ensures that their plight is the significant factor behind changes in the overall inequality figure and not the fortunes of the poor.

These observations are to a large degree supported by the inequality findings presented in chapters 4 to 6 of this study.

Due to a lack of empirical research there is much we do not know regarding regional inequalities in Iran. The debate on income inequality has taken a back seat to poverty. The existing research only tackles income inequality as an afterthought when discussing poverty.

Ironically, this is probably due to its very constancy, which makes it less attractive to empirical economists looking for cause and effect relationships.

We argue that it is this very consistency both before and after the Islamic Revolution of 1979 which gives us a clue regarding the probable structural nature of national and regional inequality in Iran. One good candidate for the structural causation is the economy's reliance on oil exports. It is argued that oil rents may be causing consistent vertical, horizontal and functional inequalities to persist in Iran.

3. Methodology

3.1 Introduction

This chapter will outline the empirical methodological framework adopted by this study in carrying out the inequality measurements presented in chapters four, five and six. Chapter seven, which relates to the creation of an inequality measure based on assets, includes its own methodology section as this is integral to explaining the derivation of the weights for the asset index.

This chapter is broken down into three main sections. In section one, we provide an introduction to Iran's annual household survey, as it accounts for the main source of our raw data. In section two, we explain how we processed the raw data in arriving at a consumption aggregate for each household. Finally, in section three we present the main inequality tools which have been used in carrying out our calculations. Further clarification on methodology is provided throughout other chapters as necessary.

3.2 Iran's annual household surveys

3.2.1 Background

Although, we make use of a wide variety of data sources such as the World Bank, IMF, UN and Iran's Central Bank, all the raw data and indeed the bulk of our analysis is based on annual surveys carried out by the Statistical Centre of Iran. Iran's very first urban household income and expenditure survey was carried out as far back as 1935[30] by Iran's Melli Bank (See SCI, 2003) in order to derive a living expenditure index.[31] No additional surveys were carried out for 24 years, when in 1959[32] a survey of living expenditure in 23 cities was carried out again by the Melli Bank. In 1963, the Statistical Center of Iran (SCI) commenced

[30] Iranian calendar year 1314
[31] At that time the Melli Bank (National Bank) had a dual role as a commercial and a central bank. In 1960 its central bank operations were replaced by Bank Markazi (The Central Bank).
[32] Iranian calendar year 1338

annual rural household expenditure and income surveys. In 1965, the Central Bank of Iran (CBI) started urban household income and expenditure surveys. This has been carried out annually ever since. Additionally, in 1968 the Statistical Centre of Iran (SCI) also started to carry out annual urban household surveys. In 1974, as well as expenditure, income levels were also surveyed by the SCI. These household surveys have been conducted annually ever since by the SCI except for the years of 1976, 1978 and 1981.[33]

In summary, annual rural household surveys are only published by the SCI, whereas annual urban household surveys are carried out and published by both by the SCI and CBI. In addition, the SCI provides access to primary unit record data for every rural and urban household survey since 1984. This author obtained the latest unit record data for every year since 1984, as well as published reports for previous years.

3.2.2 SCI methodology

The methodology of data collection and compilation by the SCI has evolved over time. The current methodology, compiled from publications by (Salehi-Isfahani, 2008, Tabibian, 2000, SCI, 2003, ILO, SCI, 2000, Vakili-Rad, 1978, Gerami et al., 2002) as well as based on our own observations and inquiries has been construed by the author as follows.

Household coverage

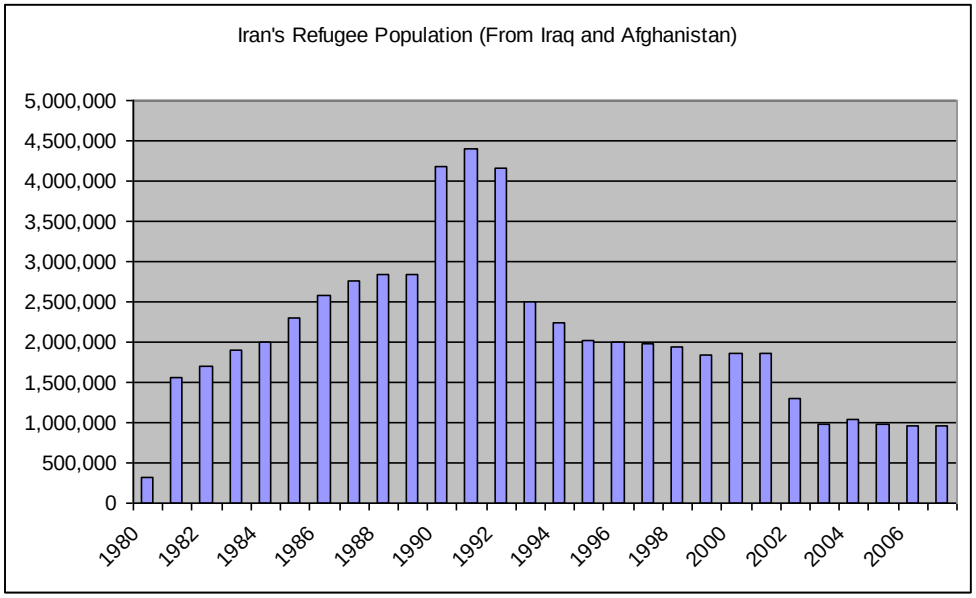
National coverage, no particular geographical areas are excluded. However, the following individuals are excluded:

- Households of Iranian nationals living abroad
- Individuals in collective housing, such as patients in hospitals, prisoners, collective religious dwellings, public military housing

[33] Iranian calendar years 1355, 1357 and 1360 respectively.

- Individuals without fixed dwellings, i.e. on construction sites and residing in informal housing. This can be particularly significant in Iran's case, as it has been host to millions of refugees from neighbouring war torn Iraq and Afghanistan. Often, these refugees do not have a fixed place of abode. They also tend to represent the lower income earners. Thus the exclusion of refugee data may lead to lower inequality and misleading income distribution findings. Spatially, refugees in Iran are also clustered in certain specific urban areas[34] and this can have consequences for unrepresentative regional inequality findings. Many disadvantaged members of the population who are non-refugees may also not have a fixed place of abode. Figure 3.2.1 shows the UN estimated trend of Iran's refugee population. For our period of empirical analysis (1997 to 2010) the refugee population ranges from one to two million.

Figure 3.2.1 Iran's Refugee population



Source: UNHCR Statistical Online Population Database

[34] See "Afghan refugees given repatriation extension", IRIN, 8 February 2007, http://www.irinnews.org/Report.aspx?ReportId=70450

The following households are included in the annual survey:

- Private households of just one or more individuals
- Non-Iranian nationals resident in Iran
- Armed forces residing in private housing within or outside military bases

Sampling and stratification

The separate rural and urban surveys are stratified at the provincial level until 2008 when the stratification also takes place at the Primary Sample Unit (PSU) level. Exact weighting data is provided from 1997 onwards[35] and this is the year chosen for the start of our analysis. We do occasionally use the year 1990 for comparison purposes. For this year we have estimated the weights based on the 1986 census data.[36] Population alone does not determine the sampling size for each province; other variables of significance for the SCI also have a bearing on the sample size. The sampling consists of a two stage process of Primary Sampling Units (PSUs) and Ultimate Sampling Units (USUs). The number of PSUs is arrived at by dividing the provincial sample size by five. The sampling frames for the PSUs are the list of census blocks from 1996, using cluster sampling. From each PSU, five households are randomly selected using systematic sampling. The overall response rate is very high, despite the large size of the questionnaire. For the year 2003 the response rate is given as 99% (ILO, 2005). Each month, one twelfth of the evenly distributed households are approached with the questionnaire. This is for practical manpower purposes and to even out seasonal fluctuations.

[35] Although this weighting data was only made available by the SCI two years after our study had already begun. The calculations were repeated using the exact weights.
[36] We have derived weights for each province based on the number of households in the sample in proportion to the total number of households in the province as reported by the census.

Recall periods

A mix of recall and documentation is used to collect the expenditure data. The recall period for most perishable expenditure items is thirty days, rather a long period for consumption recall. In the early days of the survey, there was a two day recall period for such items. The recall period for durables is one year. Depending on the income source, the recall period is either one month or one year. The recall period combined with the survey taking place evenly throughout the year results in the annual survey not reflecting the economic circumstances of that exact calendar year. This should be taken into account when comparing measures based on household surveys with other economic data.

Despite being solar based[37], the Iranian solar Hejri year, does not begin and end on the same date as its Gregorian equivalent. Typically the Iranian New Year falls on the 21st of March. For example the year 1382 starts on the 21st of March 2003 and ends on the 20th of March 2004. For the purposes of this study we denote 1382 as simply 2003. Thus we will refer to the "2003 household survey", when in reality it relates to 21 March 2003 to 20 March 2004. In appendix 3A we have provided a list of recent Iranian calendar years and their Gregorian equivalents.

The sample data

There are annual fluctuations in the sample size. One extreme example is a sample size of 27,148 households in 1984 but only 5,614 households in 1986. Tabibian (2000, p.145) reports gross inconsistencies for the primary unit data of the household survey of 1991.[38] He cites "significant differences" [author's translation] in the data when compared with 1990 and 1992. For many indicators he interpolates the results of 1990 and 1992 to arrive at a figure for 1991; in effect disregarding the data from 1991. For the period of concern to us 1997-

[37] This is not strictly true as the number of days in the two calendars slightly differ due to the solar Hejri calendar following the vernal equinox. This difference becomes noticeable during respective leap years.

[38] Iranian calendar year 1370

2010, the lowest annual sample was 17,477 for 1998 and the highest was 39,088 for 2008. In total over four hundred thousand household samples were used in our calculations. Appendix 3B outlines the urban and rural sample sizes for each year under study.

The following broad categories of data are collected from the households:

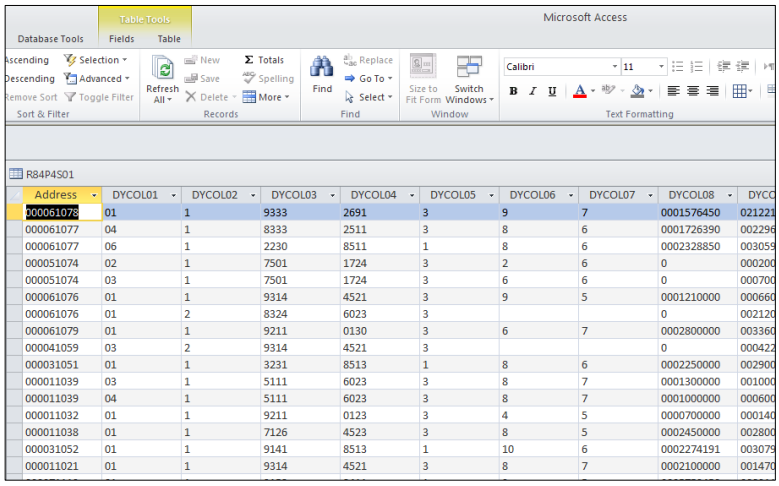
- Expenditure – hundreds of durable, non-durable goods and services. These are extremely detailed but only comply with COICOP[39] from 2004 onwards.
- Income – dozens of income channels including informal ones. Income data is recorded separately for each individual.
- Demographic characteristics
- Education attainment of members
- Employment status of members
- Occupation of members
- Ownership of selected assets
- Housing characteristics

3.3 The raw micro data

The household survey data was obtained during annual visits to the Statistical Centre of Iran in Tehran, Iran. On certain occasions, clarification on methodological issues relating to the data was provided by staff members. The data is made available by the Statistical Centre of Iran in Microsoft Access tables. As the tables have no 'meaningful' names or field headings, a separate document providing information on the tables as well as the survey questionnaire itself are needed to decipher the database.

[39] Classification of Individual Consumption According to Purpose (United Nations statistical methodology)

Figure 3.3.1 Screenshot of a table in the 2005 rural household survey



Microsoft Access

Table Tools | Database Tools | Fields | Table

R84P4S01

Address	DYCOL01	DYCOL02	DYCOL03	DYCOL04	DYCOL05	DYCOL06	DYCOL07	DYCOL08	DYCO
000061078	01	1	9333	2691	3	9	7	0001576450	021221
000061077	04	1	8333	2511	3	8	6	0001726390	002296
000061077	06	1	2230	8511	1	8	6	0002328850	003059
000051074	02	1	7501	1724	3	2	6	0	000200
000051074	03	1	7501	1724	3	6	6	0	000700
000061076	01	1	9314	4521	3	9	5	0001210000	000660
000061076	01	2	8324	6023	3			0	002120
000061079	01	1	9211	0130	3	6	7	0002800000	003360
000041059	03	2	9314	4521	3			0	000422
000031051	01	1	3231	8513	1	8	6	0002250000	002900
000011039	03	1	5111	6023	3	8	7	0001300000	001000
000011039	04	1	5111	6023	3	8	7	0001000000	000600
000011032	01	1	9211	0123	3	4	5	0000700000	000140
000011038	01	1	7126	4523	3	8	5	0002450000	002800
000031052	01	1	9141	8513	1	10	6	0002274191	003079
000011021	01	1	9314	4521	3	8	7	0002100000	001470

Figure 3.3.2 Screenshot of the food expenditure questionnaire in the 2006 survey

بخش ۰۱- هزینه های خوراکی خانوار در ماه گذشته

کد		شرح هزینه	طریق تهیه	مقدار گرم	مقدار کیلو	قیمت واحد (ریال)	ارزش (ریال)
۱		۲	۳	٤	٥	٦	۷
۰۱۱		مواد خوراکی					
۰۱۱۱		غلات ،نان ،آرد ،رشته و فراورده های آن					
۰۱۱۱۲و۰۱۱۱۱		غلات					
۱۱	۰۱۱۱	برنج صدری،دمسیاه و استخوانی					
۱۲	۰۱۱۱	برنج طارم					
۱۳	۰۱۱۱	برنج بی نام					
۱۴	۰۱۱۱	برنج چمپا وآشی					
۱۵	۰۱۱۱	برنج های محلی غیر شمالی(شامل کامفیروزی،چمپای خوزستان و..)					
۱۶	۰۱۱۱	برنج گرده ،خرده					
۱۷	۰۱۱۱	برنج خارجی درجه یک					

From 1997 onwards, the SCI provides the exact sampling weights for the households. For the years before that census provincial data is necessary in order to estimate the probability weights for a household being selected from a particular province. For each section of the questionnaire, the responses of the households are stored in distinct tables. Rural and urban tables are separate. For each household we have detailed data on its characteristics, income and expenditure.

3.3.1 Why the use of raw micro data?

Despite the time consuming nature of preparing, processing and analysing the raw data made available by the SCI, it afforded the author several notable advantages:

Standardized grouping of expenditure data

Individual household expenditures on various items were collated into desirable groupings. Rather than simply summing up individual item expenditures per the inset household survey 'expenditure categories', further subgroups were created using the specific product codes.

Table 3.3.1 Custom survey expenditure grouping

Survey grouping	Author grouping
Food	Food[40]
Drink and tobacco	Drink and tobacco
Clothing	Clothing
Rent and utilities	Rent Utilities
Household items	Household items
Medical expenses	Medical expenses
Transport costs	Transport costs
Post and telecommunications	Post and telecommunications
Leisure	Leisure
Eating out and hotels	Holiday accommodation Eating out
Miscellaneous	Miscellaneous
Durables and other	Durables Education Medical insurance
Investment	Investment

This custom grouping allowed expense categories of interest such as 'Education' to become distinct and an expense category in its own right. 'Medical insurance expenses' which were

[40] Ideally this should be broken down further into home production and purchases.

embedded in the 'Durables' category were summed up with other 'Medical expenses' to derive an overall medical expenses category for each household. Similarly 'Eating Out' expenses were added to 'Food' expenses following the recommendation by Deaton and Zaidi (2002) who provide a guideline for computing expenditure aggregates. The custom grouping carried out allows for more convenient and standardized data comparison with other countries for this author and also other researchers who may wish to use the modified datasets in future. Specifically, in reference to this study, the custom expenditure categorization and analysis allowed for:

- The proportion of food expenditure to be used in determining the household scaling weights for urban and rural households
- Specific utility expenses were used in evaluating subsidy distribution (chapter four)
- Expenditure categories were used to pinpoint the reason for the fall in real expenditures in 2008 (chapter 4)

The SCI does now provide a simple summation of food (not including eating out) and non-food expenditures. However, even with these figures there can be anomalies. For example for a number of urban households in 1999 the non-food expenditure reported by the SCI differs from the author's calculations from the raw data.[41]

Custom consumption aggregates

By making using of the micro data and custom groupings of expenditure, the author was afforded a flexible tool in deriving a number of consumption aggregates for each household. This allowed for the comparison of inequality measures which are based on different

[41] Expenditure items have been calculated using computer queries. Manual calculations were carried out on a sample urban and rural household to verify figures. The databases used by the author are the latest databases made available by SCI at the time of publication.

underlying consumption aggregates. For example, income inequality measures were compared including and omitting a combination of durables and investment expenditures. These are presented later in this chapter.

Equivalence expenditures

Using the household characteristics data the author was able to derive equivalence expenditures for each household based both on household size and makeup. For instance a household with one adult and one child is differentiated from a household with three adults and two children. Urban and rural households are also scaled differently.

Intra and inter-regional inequality

Without the use of primary unit data, the evaluation of inequality 'between and within' regions and their contribution to national inequality would not be possible, as detailed provincial inequality data for the period under study was not published elsewhere. For instance, without micro data we would not be able to find out what the contribution of Tehran is to Iran's overall inequality.

Intricate distribution comparisons

Richer distribution analysis and observations such as decile analysis, pen's parade and rural/urban shifts would not have been possible with aggregate measures.

Creation of the asset index

The creation of the asset index in chapter seven relied on asset micro data for individual households.

Transparency of inequality findings

Most importantly perhaps, both the author and readers of this study are able to fully see how the raw data was processed and how the final inequality figures were arrived at. These 'figures behind the figures' allow for a better interpretation and evaluation of the results.

3.3.2 Processing the data

Cleaning up the data

The expenditure field for a number of tables had to be cleaned up. As numbers in some have leading zeros and others do not. Some fields also have the @ sign rather than a 0.

Subgroups

Software queries based on product codes were written to collate and aggregate expenditures for each household into custom groups. These expenditure categories differ slightly from the groupings provided by the SCI survey design.

Expenditure Interval

Based on the expenditure interval (monthly or annual) for each expenditure category, a total annual expenditure was drawn up for each household. Monthly expenditures were simply multiplied by twelve.

Table 3.3.2 Recall periods for expenditure groupings

Category	Interval
Clothing	Monthly
Drink and Tobacco	Monthly
Durables	Annual
Eating Out	Monthly
Education	Annual
Food	Monthly
Holiday Accommodation	Monthly
Household Items	Monthly
Investment	Annual
Leisure	Monthly
Medical Expenses	Monthly
Medical Insurance	Annual
Miscellaneous	Monthly
Post and Telecommunications	Monthly
Rent	Monthly
Transport Costs	Monthly
Utilities	Monthly

It may have been more appropriate for the SCI survey to have used an annual recall period for ‘Holiday accommodation’ rather than a monthly recall period.

3.3.3 Choosing a proxy for inequality

Two critical preliminary questions arise in carrying out this inequality study; inequality between ‘whom’ and inequality between ‘what’? For instance, Yu, Luo et al. (2007) speculate that inequality within rural villages is not of concern in China, and do not break down aggregate village data into individual household data when analysing inequality. After some initial calculations, we found significant inequality within rural areas, individual provinces and districts in Iran. We therefore chose to investigate the smallest economic unit possible for our analysis. Given the lack of expenditure data for individuals within households, the end nodes of our analysis are households. This has particular significance

for our decomposition of inequality in chapter four. Much of the observed overall inequality could be due to inequality between the members of a household but our study is implicitly treating the household as a homogenous unit. We do remedy for this to some extent by using an equivalence scale to weight households by size and makeup, but we are in effect ignoring these intra household inequalities.

The question of 'what' to measure is a more open one (Stewart, 2000b). We have the option of looking at inequality of access to education, health, jobs or other social/public goods; we can consider the inequality of wealth in terms of all tangible and financial assets; or opt for more traditional monetary measures such as income and expenditure. Indeed, given the discussions pertaining to the rentier state in chapter two it may be more apt for our study to look at the inequality of wealth and opportunity in Iran. However, given the measurable data in hand, our focus is primarily limited to expenditure inequality. In chapter seven we do create an asset index for Iran and present it as an alternative for inequality analysis in specific circumstances. As the bulk of this study presents a wide array of vertical and horizontal inequality comparisons, it would have been beyond the scope of this research to have presented them using a non-monetary metric. In the end, our decision simply boiled down to the classic dilemma of which monetary measure to use, 'income' or 'expenditure' data.

Before we explain our decision to use expenditure data, it is apt to point out a few advantages of using income data, apart from the obvious one of income being the measure whose distribution we are addressing, when we refer to '*income* inequality'. Primarily, income data would have partly dealt with the household being misrepresented as a homogenous unit, as income data is available on an individual basis from the SCI. However, as this would still exclude non income earners, in practice in the majority of cases, all the members of the household apart from the head would be unrepresented. Income data also allows for the investigation of functional income distribution, i.e. exploring the sources of income. This can be a very useful exercise for studying rentier income distribution, as it

would become clear what proportion of income is derived directly from public pensions, public sector wages, rents from property, interest from savings etc. This can then be compared to an otherwise comparable non-rentier state. Income is also "more unequally distributed than expenditure" (Haughton and Khandker, 2009, p. 108) and by utilizing expenditure inequality we are most probably understating income inequality. This is especially poignant in the context of cross-country comparisons, where many of the GINI coefficients from industrialized countries will have been prepared on the basis of income. In essence, we are not comparing like with like. Ideally both income and expenditure data should be used and compared for various inequality measures. However, given the limited scope of this research and the number of measurements which would need to be computed and analysed, we opted solely for expenditure data.

Despite the numerous cited benefits of the income measure, its biggest deficiency is the unreliability of the figures. In Iran (as in other countries), not only are individuals reluctant to provide accurate income data, but for those who are self-employed, farmers or stake holders in small businesses, it can be an accounting hodgepodge in attempting to accurately isolate personal income. Income can be highly variable for workers in the informal market, seasonal in nature and lumpy. Certain households may also engage in significant barter trade; the expenditure data accounts for this by estimating an expenditure cost for all goods and services received. However, expenditure data can also miss out on certain 'internal' expenditures such as DIY work on home improvement. Nevertheless, the consensus in the literature is that the preferred method of evaluating income distribution in developing countries is to use consumption as a proxy for income (Deaton, 1997).

Deriving individual consumption however is itself often a proxy exercise, usually achieved by refining household expenditure data (Deaton and Zaidi, 2002). Given this double proxy process (consumption for expenditure and expenditure for income), the final figures should not be viewed as an accurate measurement of income distribution but merely as an indication. The derived 'patterns and trends' can be more confidently accepted as they

reflect the spatial pattern and evolution of income distribution over time. As already noted, household expenditure data tends to underestimate income differences (Deaton, 1997). This underestimation is amplified in Iran where significant untargeted subsidies on basic food items and utilities have been prevalent. Lanjouw (Lanjouw, 2009) argues that consumption expenditures are also an indication of how successfully a household can "access credit markets or household savings" when low incomes are prevalent in the economy and are thus a better indication of long term welfare. Other researchers such as (McGregor and Borooah, 1992), (Slesnick, 1994), (David and Stephanie, 1999) also recommend the use of expenditure rather than income data for inequality analysis. It is perhaps more genuine to define inequality for our purposes as the inequality of household expenditures, in short 'expenditure inequality' rather than income inequality.

Recently there has been a recognition of asset index measurement as a proxy for inequality (McKenzie, 2005), this may provide a good solution to overcoming the untargeted subsidy regime in Iran up to 2011. The creation of an asset index is tackled in chapter seven. In conclusion to this section, for the purposes of the inequality measurements presented in chapters four, five and six, we are making use of household expenditure data.

3.3.4 Provincial boundaries and time series data

Throughout the period under study 1997 to 2010, the number of provinces has periodically increased. This presented no particular difficulties in the data processing, as this increase involved bigger provinces being broken down into smaller ones and there was no geographic overlapping. In the 2010 household survey, the last series of data in our study, the data is categorized between 30 provinces. In mid-2010 the province of Tehran was divided into 2 provinces, introducing the additional province of Alborz. Thus, despite Iran having 31 provinces at the time of publication, the latest dataset in our analysis is broken down into 30 provinces.

Time series and cross sectional data

After a number of initial calculations, it became clear that using snapshots of cross sectional data for inequality analysis would lead to misleading conclusions as there were annual fluctuations in both vertical and horizontal inequalities. A demonstration of misleading results using cross section analysis is illustrated in chapter six, which relates to divergence analysis. This should act as a caution for researchers (especially when looking at rentier states with highly fluctuating macro indicators) who use just two years and arrive at conclusions regarding inequality trends. This made it necessary to look at the whole of the 1997-2010 time period for inequality patterns such as the national GINI, regional inequalities, divergence etc. Cross section analysis is used for data displaying more consistent trends such as urbanization, population and income share.

3.4 Deriving a consumption aggregate

Deaton and Zaidi (2002) outline a step by step approach for deriving a household consumption aggregate based on expenditure data in the hope of standardizing this practice and making researchers more familiar with the issues involved. The authors implicitly recommend that researchers publish a description of how their consumption aggregates have been arrived at alongside their results. To a significant degree the derivation of our consumption aggregate builds on these guidelines, however there are a number of exceptions for one intuitive reason.

While consumption aggregates may tell us more about welfare levels, when it comes to income distribution, a narrowed focus on consumption may substantially underestimate the income accruing to richer households. Consumption aggregates may be an appropriate proxy in identifying poorer families but if defined too narrowly, they may underestimate the extent of the inequality distribution as more and more expenditure items are excluded. In fact,

it may be more intuitive to derive a consumption aggregate for poverty analysis and a separate one for inequality analysis.

When deciding on what non-food expenditures to include in the consumption aggregate, Deaton and Zaidi (2002) suggest testing for the elasticity of the subgroup to the total expenditure of the household. This reasoning is used to exclude health expenditure, which exhibits a low elasticity in their study. Other problematic expenditure categories such as education, which also exhibit low elasticity, and are related to the ages of the children in the household, are however included, as is the practice by most other researchers. Lump expenditures, such as durables and housing, are included by their estimated 'use value'.

In this study, all expenditure items are aggregated, apart from investment. The reasoning is that there is only 'so much' that can be spent on food and consumption. For the period under study in Iran, substantial subsidies existed on fuel, utilities and food items. Limiting the core of the consumption aggregate to these expenditures, would risk underestimating the prevalence of inequality. Where, the household owns their home, equivalent rental values, provided in the survey data, have been used as a proxy for housing.

As no purchase data exists for existing durables in the household (i.e. year purchased and initial price) and as there is no comprehensive list of durables (although a simple asset list does exist), it is not possible to estimate a 'use value' for all the durables in the household. In view of this, all durable expenditures have been included. Excluding durables would narrow the consumption aggregate considerably. If our analysis were concerned with identifying households below a certain poverty line, including such lump expenditures would lead to a significant underestimate of such households. However, when it comes to looking at the extent of expenditure inequality, the number of richer households would not be represented sufficiently.

Following a similar line of reasoning, it could be argued that investment expenditures should also be included in our expenditure aggregate (we could no longer refer to it as the 'consumption' aggregate). The difficulty is that the list of the investment expenditure items is

by no means exhaustive and is not necessarily a good proxy for income as investments can be transferred from one form to another (and differ year to year).

In order to see the effects of different consumption aggregates on our inequality measures, three separate expenditure aggregates were prepared. One which includes all expenditures, one which excludes investment and one which excludes both durables and investment. See table 3.5.3 later in this chapter for a comparison of the GINI figure using the three different expenditure aggregates.

In the end, aggregate expenditure without investment but including durables was opted for. This also proved practical as the data for 1997 lacked investment data. A look at summary aggregate expenditure data provided by the SCI also seems to suggest they have derived an aggregate of expenditures by including durables and omitting investments.

3.5 Deriving an equivalence scale

Given the varying number of individuals and different demographic characteristics of the sample households, it is appropriate to use an equivalence expenditure scale to adjust for these differences. Clearly seven members of a household with a total expenditure tally of $2,000 per year are not as well-off as a one member household with the same annual expenditure. As the author found no published equivalence scales for Iranian households, one was created. There is no accepted standard for household expenditure adjustment. Deaton and Zaidi (2002), suggest various approaches to equivalence scales; including carrying out behavioural analysis, using questions to obtain subjective estimates, or by using an arbitrary approach that sets a scale in some reasonable way. All these adjustment practices seem to stick to three broad principles.

The first is that households located in significantly different economic environments should not be adjusted in the same manner. Lancaster et al. (1999a) note that “it is unwise to use the same scale value for different countries in the inequality comparisons”. In

practice, this means that researchers use custom or accepted equivalence scales for the particular region under study. For this reason we have created a different equivalence scale for urban and rural areas.

The second principle is that the different members of the household have differing needs based on their demographic characteristics. Children and the elderly may have lesser or perhaps higher monetary needs that adults; there may be differences between the expenditure needs of males and females. In practice this usually leads to researchers deflating the expenditure needs of children (and sometimes women). The amount by which the expenditure needs of a child are deemed to be less than that of an adult can be estimated for the region. In the US for example, the National Research Council (1995) recommends a figure of 0.7 to be used as the ratio of a child's expenditure relative to an adult's. This is to reflect the relatively high education, health, clothing and activity costs as compared to poor countries where Deaton and Zaidi (2002) recommend a figure of 0.25 or 0.33. Whereas the two previous studies define a child simply as an individual under 18, other studies such as Lancaster et al. (1999a) divide up children into three different age categories to more accurately reflect their expenditure needs. In their study expenditure needs are also differentiated by sex.

We have opted to treat individuals under 18 as children and assigned an adult expenditure ratio of 0.65 for children in urban areas and 0.55 for children in rural ones. The lower ratio for rural areas is due to the lower share of education expenditure in total expenditure. In 2007, see Figure 3.5.1, weighted education expenditure in rural households constituted 0.8% of total expenditures whereas the figure was 2.0% for urban households.

The third principle is that bigger households may benefit from economies of scale. The distinction between public and private goods determines the degree of economies of scale (Drèze and Srinivasan, 1997). This follows from the idea put forward by (Engel, 1895) that the proportion of food expenditure is inversely related to household income. Food and other private goods dominate the expenditure of poorer households rather than say 'housing'

which is a shared good. Hence equivalence scales for developing countries assume a smaller degree of economy of scale than for developed economies. Our methodology follows in the same footsteps outlined above. We used the following formula as put forward by the US National Research Council (Poverty et al., 1995, p.59):

$$(A + PK)^F$$

A The number of adults

K The number of children (all those aged below 18)

P Child expenditure proportion of an adult

F Reflects the economies of scale

The suggested values by the US National Research Council are to put P near 0.70 and F between 0.65 and 0.75 (for the United States). When setting poverty thresholds, we may wish to select a reference family (say 2 adults and 2 children) and compute other families as a ratio of the scale value of that family to the scale value of our reference family.

Deaton and Zaidi (2002) suggest using a value of 0.25 to 0.33 for P in poorer countries and 0.9 for F. This is based on private goods such as food expenditure contributing a major proportion to the overall household expenditure. Dreze and Srinvasan (1997) show that if all goods are private then costs rise in proportion to the number of people in the household, and if all goods are public (hence shared) then the number of people does not affect costs. If food dominates household expenditure, the scope for economies of scales is small.

Following these recommendations, in calculating the values to be used for our equivalence scale, total weighted food expenditures as a proportion of total expenditures (excluding investment) were calculated both for rural and urban households.

Table 3.5.1 Household food expenditures as a proportion of total expenditures, 2007

Food as a % of total expenditures, urban	19.9%
Food as a % of total expenditures, rural	34.4%

Figure 3.5.1 Total weighted household urban expenditure makeup, 2007

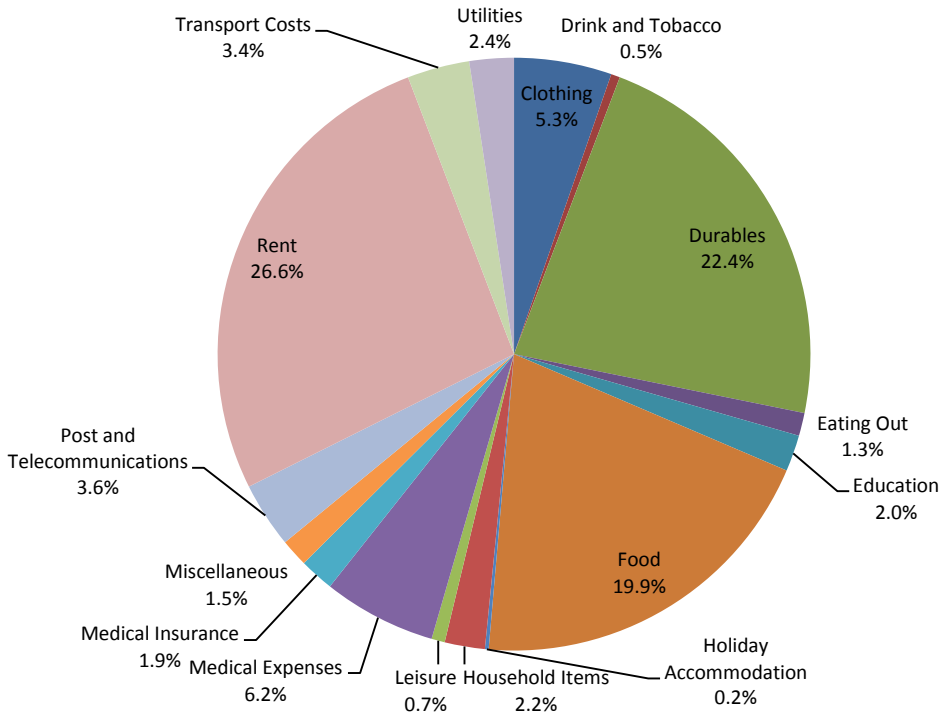
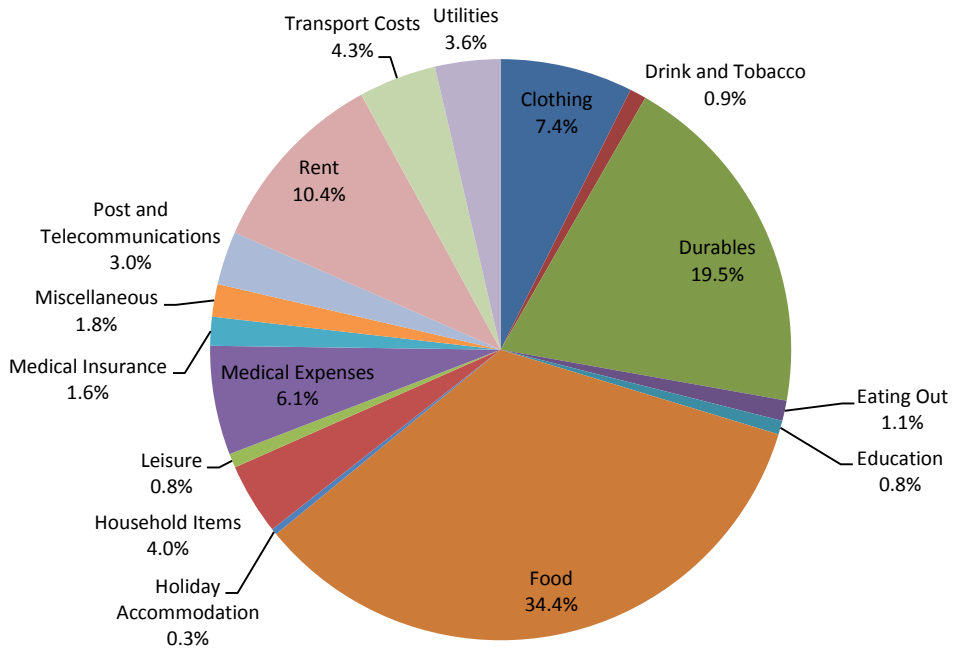


Figure 3.5.2 Total weighted household rural expenditure makeup, 2007



As can be seen the percentage of food expenditures is substantially higher in rural areas and the percentage of a shared good such as rent is much smaller. This would suggest the use of two separate equivalence scales for rural and urban areas. Although the percentage of food expenditures in Iran's rural areas is high, with the exception of Brazil and South Africa, it is less than the food expenditure percentages under study by Deaton and Zaidi (2002). Based on the recommendations of the National Research Council (1995) and the comparative study by Deaton and Zaidi (2002) the following equivalence scale values were deemed appropriate for our study.

Table 3.5.2 Equivalence scale values for Iran's urban and rural households

	P	F
Urban	0.65	0.75
Rural	0.55	0.85

Based on these values an equivalence scale for each household was calculated and the corresponding aggregate expenditures were scaled accordingly. A comparison of inequality measures between the modified and original aggregate expenditures in urban areas is presented in Table 3.5.3 for 2007.

Table 3.5.3 Comparison of urban GINI coefficients, 2007

	GINI (official weights)	GINI (calculated weights)
HE	0.47145	0.47143
HEWI	0.40298	0.40304
HEWID	0.36808	0.36819
EEHE	0.47521	0.47509
EEHEWI	0.40758	0.40754
EEHEWID	0.37458	0.37461

HE	Aggregate household expenditure
HEWI	Aggregate household expenditure without investment
HEWID	Aggregate household expenditure without investment and durables
EEHE	Aggregate equivalence household expenditure
EEHEWI	Aggregate equivalence household expenditure without investment
EEHEWID	Aggregate equivalence household expenditure without investment and durables

3.5.1 Scaled expenditures v nominal expenditures

Decomposition of inequality was carried out using the econometric package STATA module 'ineqdeco' by Professor Stephen P. Jenkins[42]. In computing the results, the final composition of the household expenditure to be used in the calculations had to be decided upon. One set of options related to what expenditures should be left in or out of the aggregate expenditure; the other set of options related to whether equivalence expenditure should be used to compensate for household makeup.

In the end, aggregate household expenditures without investment were used (but including durables). Expenditures were scaled for household makeup and measurements were weighted according to official provincial weights to reflect the provincial stratification inherent in the survey data.

Following the recommendation by Deaton and Zaidi (2002), the author has calculated equivalence expenditures from the raw nominal figures before going on to analyze inequality outcomes. All inequality figures published are based on equivalence expenditures unless stated otherwise. For the sake of completeness, a comparison was made between measures based on equivalence v nominal expenditures for the year 2007, in order to identify where the differences in the results would lie.

Higher GINI figure

Table 3.5.4 National GINI figures (weighted total of rural and urban), 2007

EEHEWI (equivalence)	0.43569
HEWI (nominal)	0.42235

The first difference is evident in the overall GINI figure. Although the difference is small, it does reflect the fact that a higher GINI figure is derived if using equivalence expenditure

[42] Before settling for 'ineqdeco' the Theil index was calculated for the urban sector of 2006 manually using equations in Microsoft Excel. After verification of the inequality figure, ineqdeco was utilized for subsequent decomposition and inequality calculations.

data. Even a small difference in the GINI index impacts many in a populous area (Robinson, 2002).

Lower contribution of rural sector to inequality

But more revealing and intuitively palatable is the difference in the decomposition of inequality for the same year, 2007.

Table 3.5.5 Comparison of EEHEWI and HEWI decomposition, 2007

EEHEWI		
	Rural	Urban
GE (1)	0.28529	0.30679
Income share	0.18015	0.81985
GINI	0.39308	0.40758
Contribution	15%	72%

HEWI		
	Rural	Urban
GE (1)	0.30532	0.29701
Income share	0.21456	0.78544
GINI	0.41501	0.40298
Contribution	20%	72%

The nominal expenditure data apportions a bigger share of overall income to the rural grouping and it also leads to more inequality within the rural group. Both of these outcomes combine within the Theil index (GE1) to result in a bigger inequality contribution from the rural sector. Underlying this result is the fact that the average number of children and adults in the rural grouping differ significantly from the urban group. This fact is ignored and 'papered over' if we apportion inequality between these two groups using nominal expenditure data. By using equivalence expenditures the author has 'factored in' such expenditure differences due to different household sizes. The equivalence figures tellingly account for the larger observed family sizes in rural households.

Table 3.5.6 Average number of adults and children 2007 (weighted)

Weighted mean	Average no. of children	Average no. of adults
Urban	1.12	2.75
Rural	1.56	2.92

This comparison was also carried out for 2010 to make sure it did not just relate to one particular year. As can be seen from Tables 3.1.1 and 3.2.2, the difference in the two methodologies leads to a difference of five absolute percentage points for the contribution of the rural sector to overall inequality, for both 2007 and 2010.

Table 3.5.7 Rural sector contribution to inequality, 2010

Rural sector, 2010	Household expenditure scaled by household size	Nominal household expenditure
Income share	15.2%	17.7%
Contribution to overall inequality	13.2%	18.6%

Higher urban to rural expenditure ratio

The difference between nominal and equivalence expenditure ratios also becomes clear when calculating urban to rural mean expenditure ratios. Given the larger rural family sizes, if nominal figures are used, the urban to rural ratio is much lower than if households are scaled for the number of adults and children. This is apparent in Table 3.5.8.

For instance, in 2005 using nominal expenditures the urban to rural ratio is 1.61 but using equivalence data the ratio is 2.00. By using nominal data, inequality calculations would underestimate the horizontal inequality between the urban and rural sector.

Table 3.5.8 Urban to Rural mean expenditure ratio 1997 to 2010

Year	U:R HEWI	U:R EEHEWI
1997	1.61	2.02
1998	1.58	1.98
1999	1.56	1.94
2000	1.59	2.02
2001	1.68	2.13
2002	1.67	2.15
2003	1.63	2.00
2004	1.56	1.94
2005	1.61	2.00
2006	1.64	2.04
2007	1.68	2.10
2008	1.76	2.13
2009	1.69	2.07
2010	1.67	2.02

Regional Discrepancies

As with urban to rural comparisons, not accounting for household size can also have implications for inter-regional inequalities. Using nominal data will lead to an underestimation of inequality between an urban dominated province and one with a considerable rural population. As can be seen in Table 3.5.9 using equivalence expenditure the mean ratio of expenditure between Tehran and Sistan & Baluchistan province is 3.11 as opposed to 2.36 using nominal data.

Table 3.5.9 Mean expenditure in Riyals, Tehran v Sistan Baluchistan, 2010

	EEHEWI	HEWI
Sistan & Baluchistan	19,000,000	54,600,000
Tehran	59,000,000	129,000,000
Ratio	3.11	2.36

Despite the advantages of scaling for household size, there are times when the use of non-scaled data is more appropriate for our study. For instance, when looking at subsidies on utilities in chapter four, we are interested in actual household expenditure rather than wishing to 'apportion' this household expenditure to individuals. Non scaled data is also appropriate when we wish to simply report absolute mean expenditures rather than make comparisons or investigate inequality trends.

3.5.2 Anomalies and weights

At the beginning of this research, there were no official weights provided for household data by the SCI. However, the SCI now provides the weights it has utilized for annual surveys from 1997 onwards. Although in the end, we substituted official weights for all our calculations, given our initial estimation of weights, this provided an opportunity for a comparison between this author's weights and the official weights. A brief description of this comparison is provided in appendix 3C. Also included is a discussion of minor data anomalies.

3.6 Inequality tools

The traditional axiomatic approach deems an inequality measurement desirable if it broadly meets five axioms (Litchfield, 1999):

1. **Pigou-Dalton Principle** – if an income transfer from a poorer to a richer individual occurs, inequality does not fall
2. **Income scale independence** – if all incomes change by the same proportion, inequality is not affected
3. **Population principle** – Inequality measure should be independent of the size of the population
4. **Anonymity** – Other than income, the inequality measure is not concerned with other characteristics of individuals
5. **Decomposability** – Inequality of subgroups should be 'related'[43] to the overall group.

However, in this study, we do not stick to only measurements which meet all these five axioms and a more pragmatic approach is taken. Inequality measures tend to provide the same overall outcome in terms of ranking and when looking at trends; "the choice of one measure over another is not of crucial importance in the discussion of income (or expenditure) distribution." (Haughton and Khandker, 2009, p. 107).

We have adopted measurements which are deemed to be the most appropriate for each particular section of our data analysis. These include the use of the GINI coefficient, the General Entropy family of measures, most significant of which is the Theil index for decomposition purposes, Stochastic dominance (Pen's Parade), Atkinson index, Sigma Convergence, Polarization, Decile Analysis and Alpha means. Below we take a more detailed look at the GINI and Theil index as these two measures are used extensively

[43] The degree of decomposability defers from measure to measure. For example the GINI coefficient is decomposable under certain circumstances, whereas the General Entropy measures are always completely and additively decomposable.

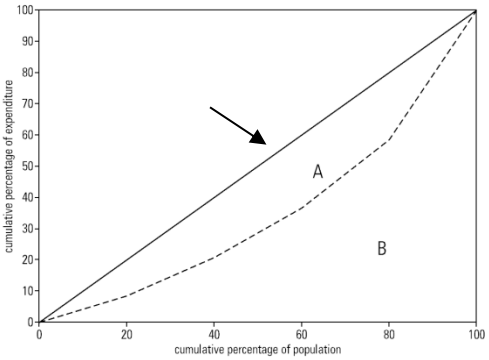
throughout the study. The other measurement tools are briefly introduced in context, alongside their respective results in the pursuing chapters.

GINI Index

Due to its simple intuitive appeal, the GINI coefficient is the mostly widely recognized and quoted measurement of income inequality (Coudouel et al., 2002). That in itself often makes it a 'must have' measurement in national studies of inequality, as it provides a basis for comparison with other countries.

Figure 3.6.1 Lorenz curve

Reproduced from: (Haughton and Khandker, 2009)



Based on the Lorenz curve, as seen in figure 3.6.1, a simple graphical representation of the GINI is the area (A) divided by the total area (A+B) under the 45 degree line of equality. As the scale of the axes is from 0 to 1, (A+B) is equal to 0.5. It can therefore be shown that A/(A+B) is also equivalent to 2*A.

A simple mathematical representation of the GINI coefficient is related to the covariance between the income of an individual Y, the rank of the individual in the distribution F, and the average income (Bellù and Liberati, 2006b).

$$\text{Gini} = 2\,\text{cov}(Y, F) / \bar{y}$$

Y Individual income

F Income rank in the distribution (0 poorest to 1 for the richest)

$\bar{y}$ Mean income

The GINI coefficient has a universal appeal of being widely cited and meeting the five aforementioned axioms[44].

However, as an inequality measure it suffers from a number of setbacks. Although its universal nature, allows for cross-country comparisons, the GINI coefficient is derived from diverse measurement techniques across countries which makes straightforward cross country comparisons troublesome, especially where the methodology is not outlined explicitly. Even for the same country, different researchers may opt for different treatments of the raw data. For example in our study we are scaling households for size and makeup whereas the Statistical Centre of Iran does not make this adjustment in its figures.

Furthermore, the coefficient provides an indication of inequality but little about the intricate nature of the distribution. As a single measurement figure, it cannot provide extra information regarding changes in the fortunes of the poor or rich. This is illustrated in chapter four's comparison of the rural sector between 1990 and 1997. A fall in the GINI figure occurs between these two dates, but the nature of the distribution change is seen much more clearly with the use of a Pen Parade.

[44] The GINI index is not additively decomposable and can only be decomposed in special circumstances

The GINI coefficient gives the same weight to those at the top and bottom of the distribution. It is therefore difficult to attribute annual changes in the GINI to a particular group within the income distribution. We remedy for this by making using of General Entropy measures which can be manipulated to be more sensitive to the top or bottom of the distribution and by additionally comparing decile income shares.

Despite the statistical drawbacks of the GINI coefficient (Cowell, 1998) it can be more confidently used to compare inequality between regions in a single country where measurement techniques and policies are uniform. As well as measuring the GINI for Iran's provinces, we will also be measuring the GINI index for Iran's urban and rural sector from 1997 to 2010[45].

Theil index

The GINI coefficient, although decomposable if income groups do not overlap, does not provide the straightforward between group and within group additive decomposability of overall inequality, unlike the Theil index, which is a member of the General Entropy inequality measures (Conceição and Ferreira, 2000). For N individuals of income y, The formula for the family of General Entropy measures (GE) is given as:

$$GE(\alpha) = \frac{1}{\alpha(\alpha-1)}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1\right]$$

α is a parameter representing the weight given to different parts of the distribution. For lower values of α, the GE measure is more sensitive to changes in lower incomes and for higher values of α (more than 1) more sensitive to changes in higher incomes. For $\alpha = 1$, i.e. GE(1) is equivalent to Theil.

$$\text{Theil} = \left[\frac{1}{N}\sum_{i=1}^{N}\frac{y_i}{\bar{y}}.\ \log[\frac{y_i}{\bar{y}}]\right]$$

[45] We will also measure the GINI for 1990 for comparative purposes.

$$Theil = \sum_{i=1}^{m} w_i \log \frac{w_i}{n_i}$$

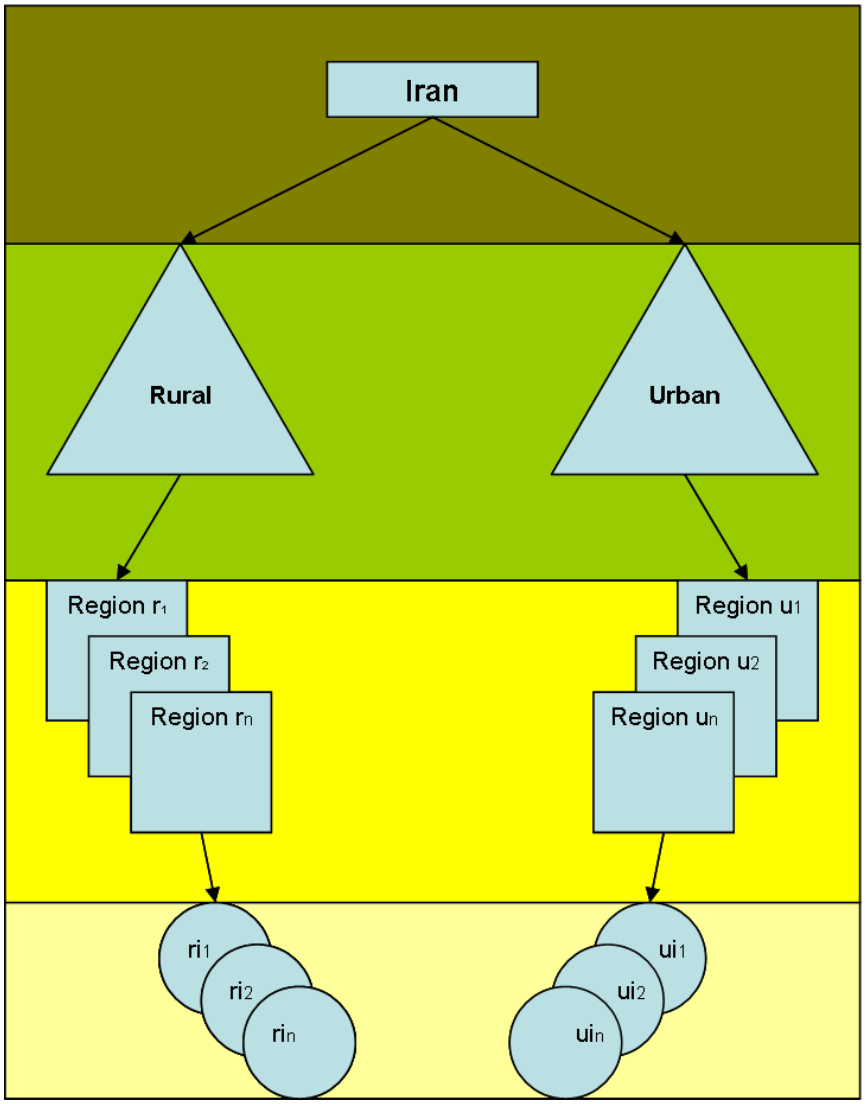
Inequality between m different groups

m	Number of groups
w_i	Group i's income share
n_i	Group i's population share

Given the additive characteristic of within group and between group inequality, the Theil index will be used to assess the contribution of Iran's urban and rural population, as well as its provinces to Iran's inequality. Please note that in practice the end nodes of our decomposition data are households and not individuals.

$$T_{Iran} = T_{RuralUrban} + T_{Region} + T_{Individuals}$$

T_{Iran}	Overall Theil inequality for Iran
$T_{RuralUrban}$	Weighted average of inequality between the rual and urban areas
T_{Region}	Weighted average of inequality between the regions within rural and urban areas
$T_{Individuals}$	Weighted average of inequality between individuals within regions in rural and urban sectors



The format of the Theil expresssion presented here is based on (Takahiro, 2003).

$$T_{Iran} = \sum_{s} \sum_{r} \sum_{i} \left(\frac{y_{sri}}{Y} \right) \log \left(\frac{y_{sri} / Y}{n_{sri} / N} \right)$$

n_{sri} is the 'population' of each individual in each region of every sector equivalent to 1 in our case.

$$T_{Iran} = \sum_{s} \sum_{r} \sum_{i} \left(\frac{y_{sri}}{Y} \right) \log \left(\frac{y_{sri} / Y}{1 / N} \right)$$

y_{sri} is the income of individual i in region r in sector s

Y is the total income of all individuals $\left(= \sum_{s} \sum_{r} \sum_{i} y_{sri} \right)$

N is the total population of all individuals

The Theil index decomposition sheds light on the principal geographic contributors to income inequality in Iran and provides guidance for policy makers, highlighting regions of particular concern. As with the GINI coefficient, the Theil index can be modified and extended for more analysis. For example population rather than income can be used to weight the inequality differences. General entropy measurements more sensitive to the lower or upper income scale are additionally carried out in chapter four by inputting different values for the parameter α.

3.7 Improvements on our methodology

While attempting to adopt a sound methodology given the constraints and wide scope of the empirical research, the author acknowledges many methodological caveats and improvements which may be remedied in future research. A number of these include:

1. The survey data itself, as with most household survey secondary data, may be subject to bias. The interviewer, interviewee and the questions themselves may be biased. Most significantly, there could be significant gender bias. As most household heads are men, women may have provided alternate answers. As already mentioned there are also many who are excluded from such surveys. This could be partly remedied by investigating the original field methodology and making appropriate adjustments to the raw data.
2. It is also likely that the poorest and richest households are 'missed' by such surveys due to lack of access. This would mean inequality findings are underestimated. It would be apt to develop an estimate of the extent of missing households from the poles of the distribution and factor this into the measurements.
3. Rather than taking an arbitrary approach to estimating the equivalence scale, another approach would be to 'calculate' the equivalence scale from the expenditure data. See the approach by Lancaster et al (1999b).
4. When we delete households with missing values we may me causing a bias towards richer households as poorer households are more likely to lead to missing values (Cortinovis et al., 1993). A better approach to missing values may be needed. "However, attributing mean scores for missing values reduces variation among households, and increases the potential for clumping and truncation." (Vyas and Kumaranayake, 2006, p.463)

5. Our study is concerned with the composition, observed patterns and trends of inequality and is not concerned with how household characteristics relate to underlying inequality. Although decomposing the GE (1) measure provides valuable information on the geographic location and composition of inequality, this methodology is very limited in pointing out the potential household determinants of inequality. Our findings are primarily descriptive in nature. Regression based decomposition techniques are designed to identify possible determinant variables. Fields (1997) proposes a technique which assesses the contribution of specific income sources or household characteristics to inequality. The result is independent of the inequality measurement used. This methodology has been used recently by Morduch and Sicular (2002a) and Wan and Zhou (2005) among others. This methodology would be appropriate for an extension of this study to investigate household characteristics.
6. Income data as well as expenditure data can be used in estimating inequalities and a comparison can be made between the two sets of figures.
7. While we use a separate and rural and urban CPI, the underlying prices may differ in the two sectors. We are merely looking at expenditures but real prices may be lower in rural areas than in urban ones. In addition to the separate CPI, it would be beneficial to construct an urban rural exchange rate using the expenditure data.
8. Ideally separate provincial CPI and PPP indexes should be constructed for each province to account for differences in the underlying prices of goods and services, say between the capital city of Tehran and an outlying province with a relatively higher rural population such as Sistan and Baluchistan.

3.8 Conclusion and summary

This study makes extensive use of the raw databases from the annual household surveys of the Statistical Centre of Iran. The findings presented in subsequent chapters rely on the integrity of this secondary data. The choice of raw data over aggregate data or summary household data provided by the SCI, was driven by a number of considerations:

1. The desire to follow a particular methodology, such as the re-categorization of expenditure data and use of equivalence scales.
2. The need to analyse particular expenditure categories for purposes such as the analysis of subsidies, or for the construction of the asset index.
3. To be able to carry out intricate and specific inequality calculations, such as the urban share of the poorest decile, or the overall inequality contribution of Tehran.
4. To be fully aware of the underlying data and methodology used in arriving at our findings.

Expenditure rather than income data was used in constructing an aggregate for each household. The expenditure data was 'cleaned up', re-categorized and before settling on the final expenditure aggregate, different aggregates were tested for inequality distribution. It was deemed necessary to create an equivalence scale for household size, as the author was unable to find one in the existing published literature. Households were scaled using a separate urban and rural equivalence scale.

A number of inequality tools are used throughout the research and are presented in context alongside the findings. As well as the GINI figure, the GE(1) Theil index is used extensively for inequality decomposition calculations. A summary of STATA modules used for the major calculations is provided in appendix 3D.

Summary of major methodological steps

1	The data	Iran's annual urban and rural household surveys
2	Consumption a proxy for income	Clean up data. Re-categorize individual expenditures into new expenditure categories. Derive an appropriate expenditure aggregate estimate from household expenditure data. Use methodology as outlined in (Deaton and Zaidi, 2002)
3	Equivalence scales	Create a separate urban and rural equivalence scale based on household size and the number of adults and children. Apply to all households.
4	GINI coefficient	To build up a picture of national and provincial vertical inequality.
5	Theil decomposition	To estimate the contribution of rural-urban, inter-regional and intra-regional inequality to overall inequality. To identify the main geographic components of inequality.
6	Use of other inequality tools	Deciles, Pen Parade, Alpha Means, Sigma Divergence, Polarization etc. to derive more intricate and specific inequality patterns and trends.

The methodology itself led to several findings. Relating to Iran, there is the revelation of the unrealistic constant urban/rural population share for the years 1997 to 2004 resulting from official weights (see appendix 3C for further details). Two wider implications also arose. The use of an equivalence scale may not have a major effect on the overall GINI figure, but it leads to considerable differences in the decomposition of vertical inequality and the measurements of horizontal inequalities where family size matters, such as inter-provincial and urban/rural inequality. It also became clear that given the macroeconomic fluctuations in a Rentier state, researchers should be aware of using isolated snapshot years in arriving at inequality patterns and trends. The choice of different annual pairings within a broader period can lead to contradictory results.

4. Vertical inequality

4.1 Introduction

Vertical and horizontal income inequality measurements relating to Iran are rarely analysed in depth or systematically decomposed in published research. This is perhaps due to the observed consistency in the year on year GINI figure, which provides little clues as to the patterns and determinants of the underlying inequality. Using the methodology and data sources outlined in the previous chapter, the results of this study on the level, pattern and composition of vertical expenditure inequality in Iran will be presented. The aim of this chapter is twofold:

1. Empirically, to measure, analyse and report the levels, patterns and geographic composition of Iran's national expenditure inequality from 1997 to 2010[46] and to fill this gap in the literature.
2. Theoretically, to ascertain whether the weight of the findings support the implicit implications of rentier theory for vertical income distribution.

The empirical findings of the research are numerous and wide ranging. Only results directly addressing the two outlined objectives will be presented. Supporting calculations are presented in the appendix. The chapter is broken down into two broad sections. We first investigate the broad patterns of vertical inequality during the 1997-2010 period, and we subsequently decompose it into its geographic components.

4.2 Summary of results

The results broadly support implicit rentier theory predictions on income distribution. Our findings point to a consistently high vertical inequality level year on year, with a sudden and sustained drop in 2008 due to a decrease in the expenditure share for the richest grouping. Indeed we will demonstrate that in general the observed inequality fluctuations for this period

[46] Due to data availability at the time of research, the exact time period under study may differ slightly depending on the particular analysis being carried out.

are manifested mostly in the top income group. There is a clear and growing urban income distribution bias in sync with government expenditure, with a consistent urban/rural divide which mirrors the national GINI figure. Energy subsidies benefit the richer income groups and recent fuel rationing has had a minimal effect on overall income distribution.

Although growth and government expenditure have not affected income inequality fluctuations directly, government expenditure has affected inequality composition by favouring the urban sector. This pattern has been broken (or perhaps temporarily disrupted) in 2008. Following the global financial crisis, a drop in output, a drop in oil rents and a real fall in mean household expenditures has reduced inequality and kept it constant until 2010. The inequality decrease has manifested itself in a shift of income from the richest decile to other income groups.

The geographic breakdown of Iran's vertical inequality reveals a growing inequality contribution by urban areas and especially from 'within' the urban areas rather than between them. Government expenditure has led to an increase in urban income and population share, 'dragging in' with it the inequality component of the rural areas. As we will see, inequality in Tehran alone, now accounts for a quarter of all national inequality.

The inequality contribution arising 'between' urban areas is actually on the decrease but rising 'within' inequality is offsetting this decrease for the total urban contribution to inequality. Conversely when it comes to rural areas, in-between inequality is on the increase and within inequality is decreasing. The income and population transfer to urban areas has led to a more locally homogenous but nationally fragmented rural sector. A direct horizontal comparison of the urban and rural sector is presented in chapter six. The wider implications of these findings are presented in the conclusion to this chapter.

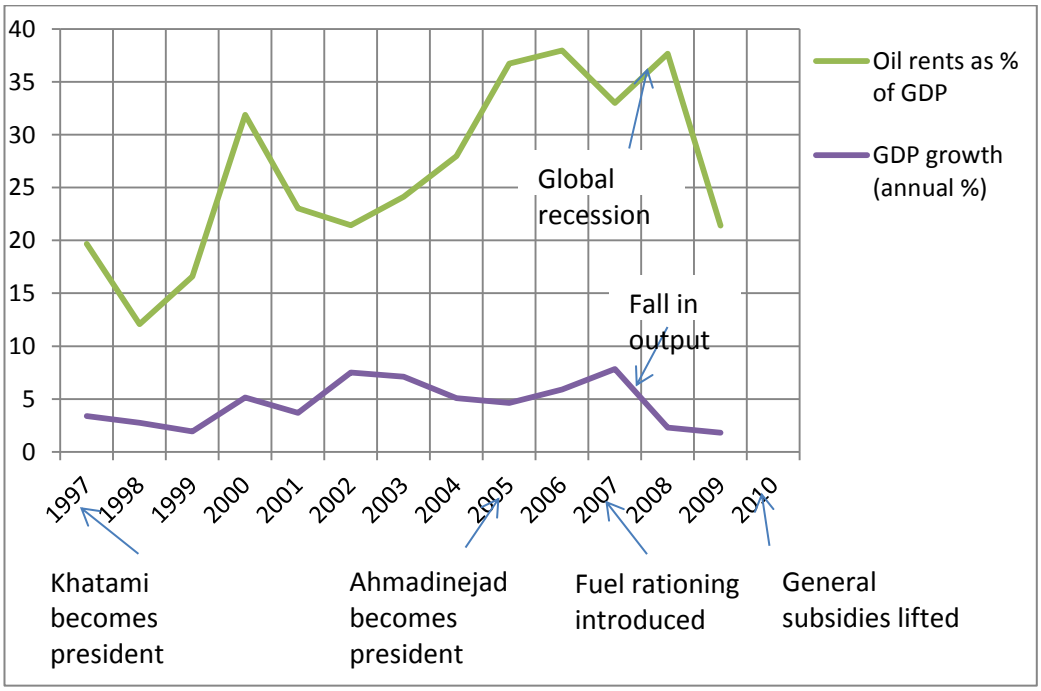
4.3 The period under study, 1997- 2010

Before we present our findings, a brief note about the period under study. Iran's post-revolutionary economic activity was dominated by immediate and extreme structural

changes post 1979, and the subsequent Iran-Iraq war 1980-1988. From 1989 to 1997 the economy started a period of normalisation under the presidency of Akbar Hashemi Rafsanjani. As a number of 'poverty/inequality' studies have already been carried out covering periods of Rafsanjani's presidency (Tabibian, 2000, Assadzadeh, 1997), we have opted to cover the period which starts with the presidency of Mohammad Khatami and ends with the twilight years of President Ahmadinejad's governance. Having a bearing on our decision was the availability of exact weighting data for household expenditures by the Statistical Centre of Iran (SCI) from the year 1997 onwards. For data consistency reasons we chose this as our cut off point. Occasionally for the purpose of confirming trends we compare the data to 1990, for which we estimated household provincial weights by using census data.

Figure 4.3.1 Growth and oil rents 1997-2009

Source: World Bank



From 1997 to 2005, President Khatami, continued Rafsanjani's broad policy of industrialization, privatization and liberalization. Although this led to a period of sustained

growth and a fall in poverty (Salehi-Isfahani, 2008), inequality levels remained unaltered (as we will see later in this chapter). We contend that this is largely due to a lack of change in the rentier structure of the economy.

Oil rents accounted for an increasing share of the GDP. As for their disbursement, despite the privatization program, by the end of his tenure the economy was still dominated by a large public sector in the shape of state or 'pseudo state' companies. Fiscal re-allocative measures remained ineffective and the government share of revenue from taxation remained constantly low and actually fell as a percentage of GDP from 11% to 8% during his tenure. General energy subsidies (favouring the rich as we will see) still remained in place by 2005. In absolute terms, by the year 2000 Khatami's government is reported to have paid twice the amount of subsidies as in 1996.[47]

President Ahmadinejad's presidency was marked by a declared mantra of reducing national and regional inequalities as stated in Iran's fourth five year development plan (2004-2009). Fuel rationing was introduced (mid 2007) and at the very end of our research period (December 2010) a process of removing general subsidies started in earnest. The global recession affected Iran from 2008 reducing oil export revenues and decreasing the growth rate. Since 2010, general subsidies have largely been lifted; however the rapid depreciation of the currency in 2012 has led to the nominal lifting of subsidies to be negated significantly in real terms and inflation has risen sharply.

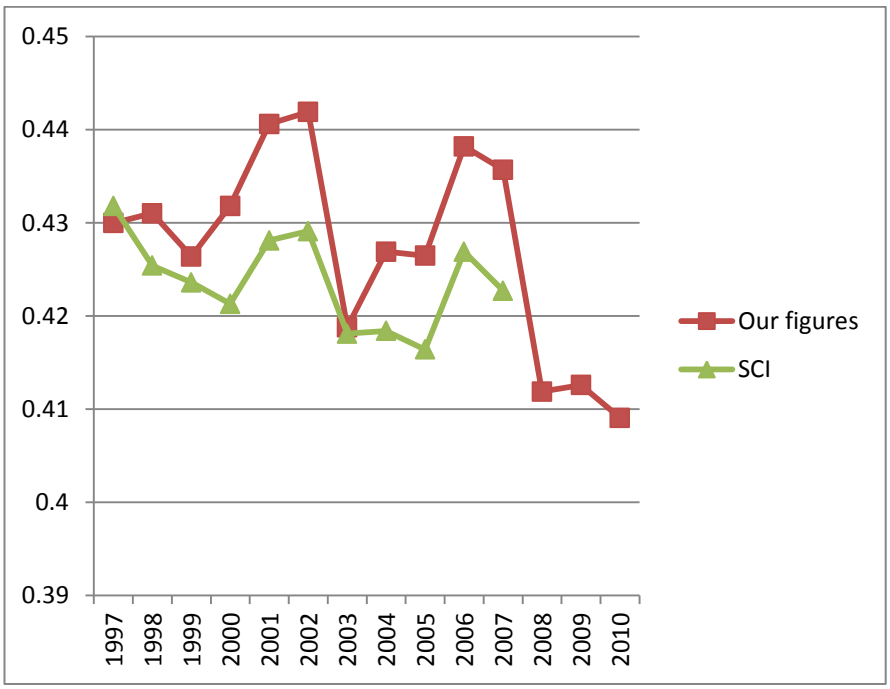
International sanctions on goods, services and financial transfers have been considerably tightened on Iran. Oil exports have fallen as a result. Unfortunately, we do not have any data post 2010 for the purposes of this study and are unable to measure the impact of the latest economic developments, which are considerable in magnitude, on Iran's income distribution.

[47] See the article by the Iranian economist Sohrab Behdad http://www.merip.org/mero/mero052101.

4.4 Headline inequality measurements

The national GINI figures computed on the basis of 'equivalence household expenditure excluding investment' using the methodology set out in chapter three are presented in Table 4.4.1. These figures have been scaled to take into account household size and makeup. The SCI does not follow our methodology and to indicate the level of discrepancy a comparison of these GINI measurements with the SCI figures is provided in figure 4.4.1.

Figure 4.4.1 Computed national GINI measurements v SCI figures



Separate SCI rural and urban GINI figures were not available for comparison.

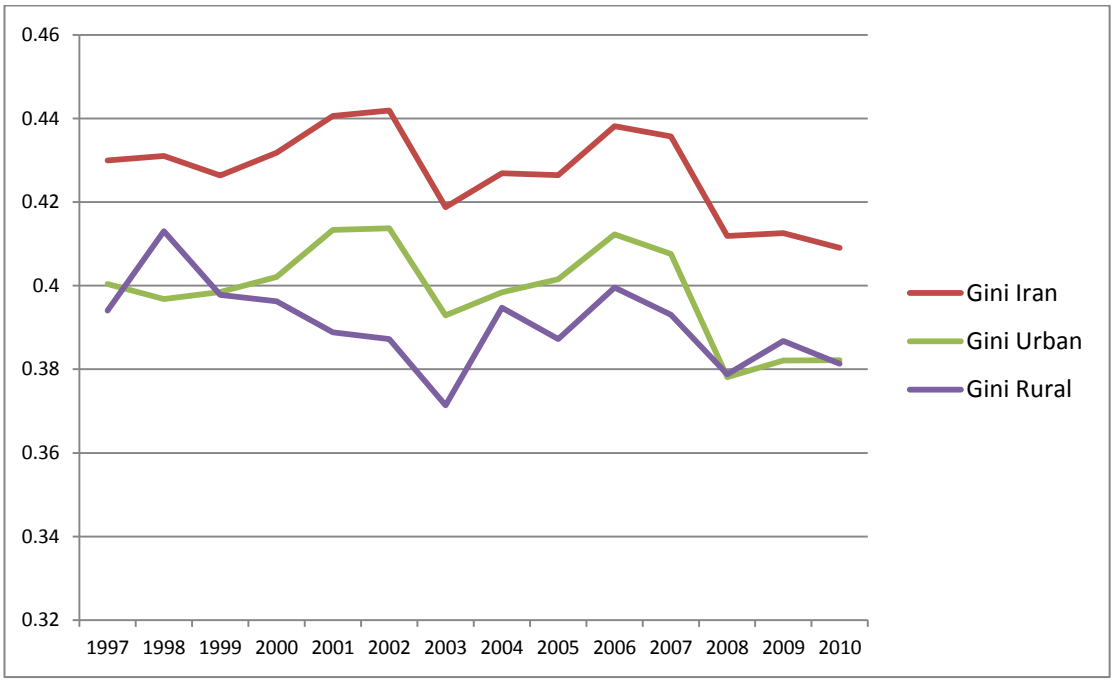
Both sets of measurements follow the same trend, but it is evident that our measurements (which take into account household size and makeup) indicate a slightly higher level of inequality.

Table 4.4.1 Iran GINI figures, 1997-2009

Equivalence household expenditure without investment

Year	GINI Overall	S.E	GINI Urban	S.E	GINI Rural	S.E
1997	0.430	0.0033	0.400	0.00412	0.394	0.00401
1998	0.431	0.00322	0.397	0.00404	0.413	0.00376
1999	0.426	0.00334	0.398	0.00421	0.398	0.00342
2000	0.432	0.00327	0.402	0.00402	0.396	0.00377
2001	0.441	0.00357	0.413	0.00439	0.389	0.00301
2002	0.442	0.00367	0.414	0.00452	0.387	0.0033
2003	0.419	0.0035	0.393	0.00427	0.371	0.0038
2004	0.427	0.00343	0.398	0.00415	0.395	0.00533
2005	0.426	0.00363	0.402	0.00437	0.387	0.00366
2006	0.438	0.00336	0.412	0.00405	0.400	0.00332
2007	0.436	0.00387	0.408	0.00469	0.393	0.00415
2008	0.412	0.00347	0.378	0.00416	0.379	0.00338
2009	0.413	0.00433	0.382	0.00506	0.387	0.00465
2010	0.409	0.00379	0.382	0.00447	0.381	0.00354

Figure 4.4.2 Iran overall/urban/rural GINI, 1997-2010



The results in table 4.4.1 show a national GINI index which fluctuates between a 0.41 and 0.44 range from 1997 to 2010. A calculation of the Atkinson inequality measures is also reported in appendix 4A to confirm this inequality trend. Although the figures appear to be fairly homogeneous, four main findings of interest emerge from these measurements:

1. Iran's GINI index still remains consistently high

Fluctuating between 0.41 and 0.44[48] the GINI index for 1997-2010 is largely in line with reported pre and post Islamic revolution figures[49]. Pesaran (1976) computes GINI figures fluctuating within a 0.42 to 0.45 range for the years 1969 to 1972. Behdad (1989) calculates a range of 0.40 to 0.43 (urban only) for the period of 1980 to 1984. Salehi-Isfahani's (2008) GINI figures for the period 1984 to 2005 range from 0.43 to 0.46. The only 'outliers' are the urban GINI figures reported by Behdad (1989) for the years 1977 and 1979, the two years immediately preceding and succeeding the Islamic Revolution.[50] We can conclude that for (at least) the past four decades Iran has consistently belonged to the club of nations manifesting a GINI coefficient of over 0.40. Despite numerous pre and post-revolutionary government policies to tackle inequality, it has not decreased.

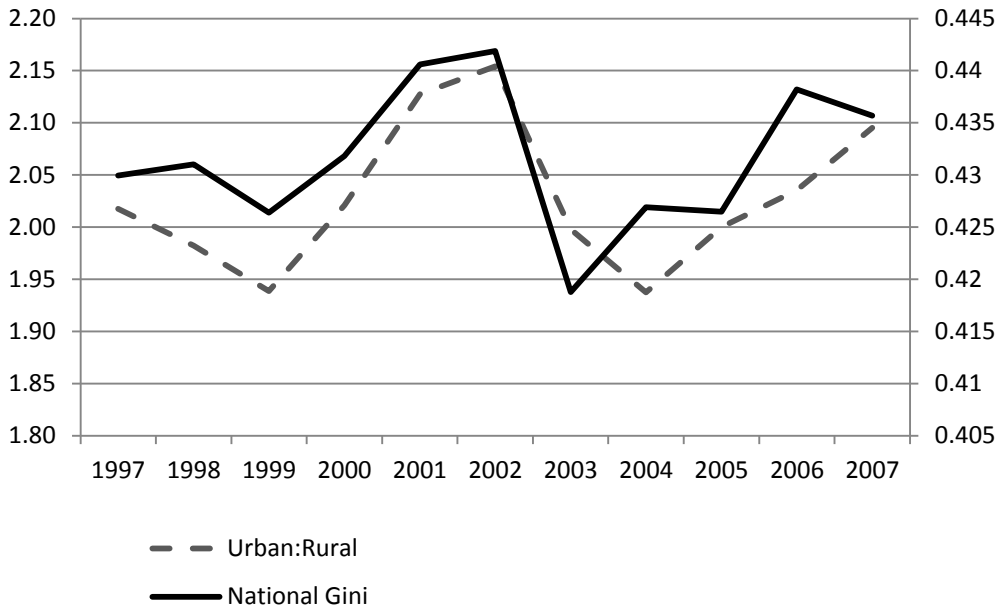
2.Urban / rural expenditure ratio

For the period under study, the national GINI figure is higher than either the urban or rural GINI figures on their own, suggesting an observable impact of the urban/rural divide upon the overall GINI.[51] In figure 4.4.3 we plot the ratios of the calculated equivalence mean

[48] These comparisons have been rounded to 2 decimal places for clarity
[49] Please note that figures calculated by third parties are based on different methodologies and are not reported to be based on 'equivalence expenditure'.
[50] The urban GINI figures reported by Behdad (1989) are 0.4998 for 1977 and 0.4702 for 1979.
[51] Pesaran (1976) also suggests such a relationship for the pre-revolution period. See PESARAN, M. H. (ed.) 1976. *Income Distribution and Its Major Determinants in Iran*: Aspen Institute for Humanistic Studies.

expenditures of urban to rural households alongside the national GINI figure, and this relationship becomes clearer. The table of the measurements is in appendix 4B.

Figure 4.4.3 Mean urban : rural household expenditure (Equivalence Scale)



For the period 1997 to 2007 we find a 0.8 positive correlation[52] between the mean urban to rural expenditures and fluctuations in the national GINI figure. This does not assert a cause and effect relationship, but it does present a picture of the significant role of the urban-rural divide on inequality fluctuations for this particular period. This relationship holds during this period of relative economic stability and sustained economic growth, but it breaks down after a real fall in household expenditures in 2008. As we will see later in this chapter, in 2008, the loss of income share by the top decile is the primary factor behind the fall in the GINI figure.

[52] A correlation coefficient of 0.7996, with a p-value less than 0.05

3. National GINI figure is driven by the urban GINI

Figure 4.4.2 clearly demonstrates that trends in the National GINI index are determined mostly by the urban GINI coefficient and not the rural GINI. Looking at the data behind the GINI figures, it becomes clear that this dominance is due to the urban sector's major and still growing 'income' share[53]. Using the same equivalence expenditure methodology, urban income share for 1990 was compared to that of 2009:

Table 4.4.2 Income share urban sector 1990 v 2009

Year	Income share urban	Population share
1990	70.8%	57.4%
2009	84.6%	72.7%

As can be seen in table 4.4.2, the reason for the increase in urban household income share is directly related to the increase in the urban household population share from 57.4% to 72.7%.

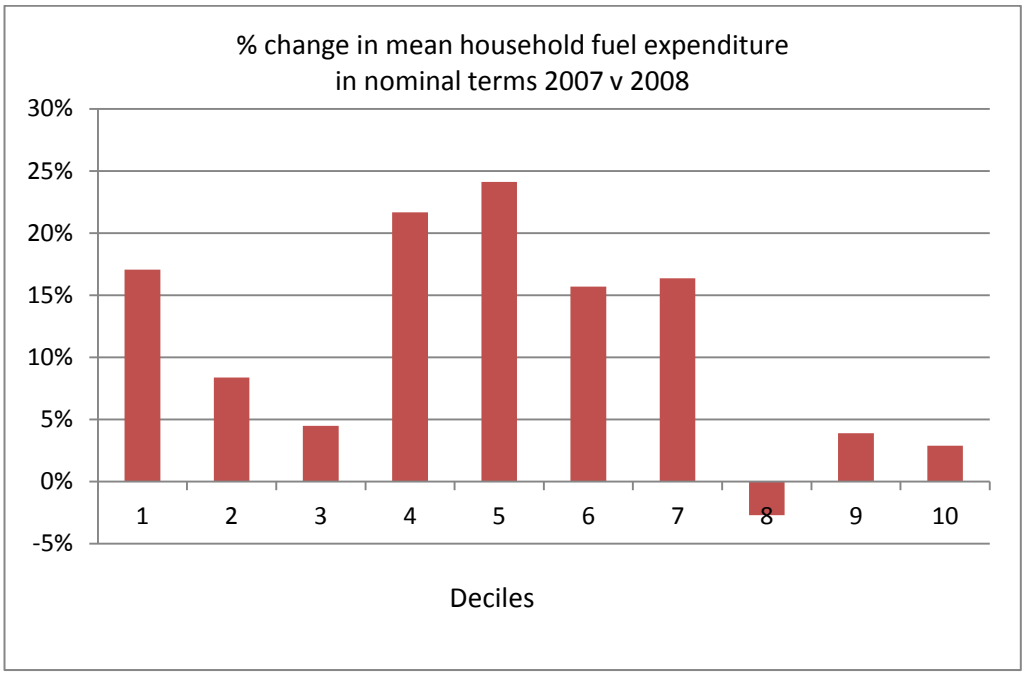
4. There is a sharp drop in inequality in 2008

The results reveal a sudden drop in inequality in 2008 from 0.436 in 2007 to 0.412. This lower level of inequality is sustained for the years of 2009 and 2010. This reduction in inequality has been manifested in a loss of income share for the very rich from 33% in 2007 to 30.6% in 2008 (see the decile analysis later in this chapter).

An obvious culprit for the 2008 fall in inequality is the regularly cited and much publicized (Guillaume et al., 2011) government policy of fuel rationing, introduced in July 2007 as a first step in removing inequality enhancing subsidies. As we can see in figure 4.4.4 this has indeed resulted in a more even fuel expenditure pattern among households.

[53] Please note that references to 'income' are based on proxy calculations using expenditure data. In effect the research is studying expenditures and not income directly.

Figure 4.4.4 Change in household fuel expenditure by decile, 2007 v 2008

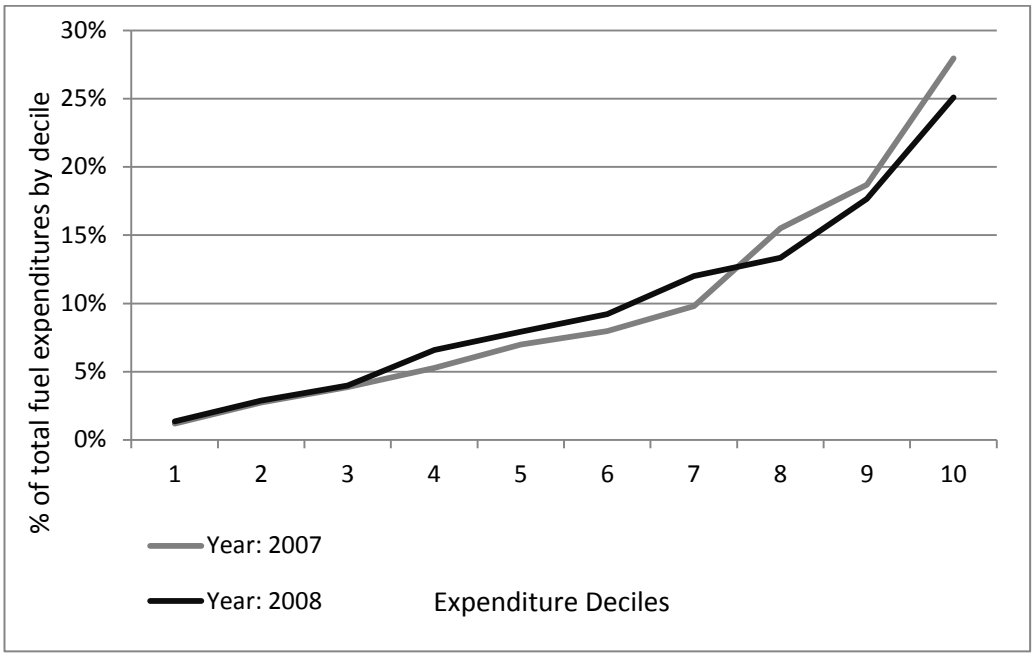


The poorest decile and the middle classes increase their nominal fuel expenditure much more than the three richest deciles which lose against all the other deciles in terms of expenditure share. Despite this notable change in mean household expenditure, when looked at in aggregate terms (see Figure 4.4.5), the changes in the decile mean expenditures translate into only a marginally more equal distribution of total fuel expenditure in 2008. For the very poor the change is hardly noticeable but there is clearly a small shift of expenditures from the very rich to the middle class.

When we also consider that fuel expenditures accounted for less than one percent[54] of total household expenditures in 2008, it becomes apparent that this expenditure category does not form a very significant component of the overall expenditure makeup. Therefore, despite its equalizing effects, we can safely dismiss the fuel rationing scheme in 2007 as being the reason for the witnessed decrease in national inequality.

[54] The proportion of fuel expenditures in total household expenditure excluding investment expenditure is 0.76% in 2008.

Figure 4.4.5 Aggregate fuel expenditure by decile, 2007 v 2008[55]



A much more likely culprit behind the sudden drop in inequality, is the fall in economic output due to the global financial crisis, the subsequent decreases in oil rents and the resulting tax revenue increase as a percentage of government revenues between 2007 and 2009. If we deflate urban mean household expenditures[56] we can see that, in 2008, expenditures fall for the very first time during the period under study by almost 8% in real terms. A table of deflated mean urban and rural household expenditures is provided in appendix 4C. This has adversely affected the very rich proportionally more than other income groups, decreasing income inequality.

[55] Please note that we have not scaled the households for size for this fuel analysis.
[56] We have used the Urban CPI from the Central bank to deflate the expenditures. The CPI has been modified to make 2004 the base year.

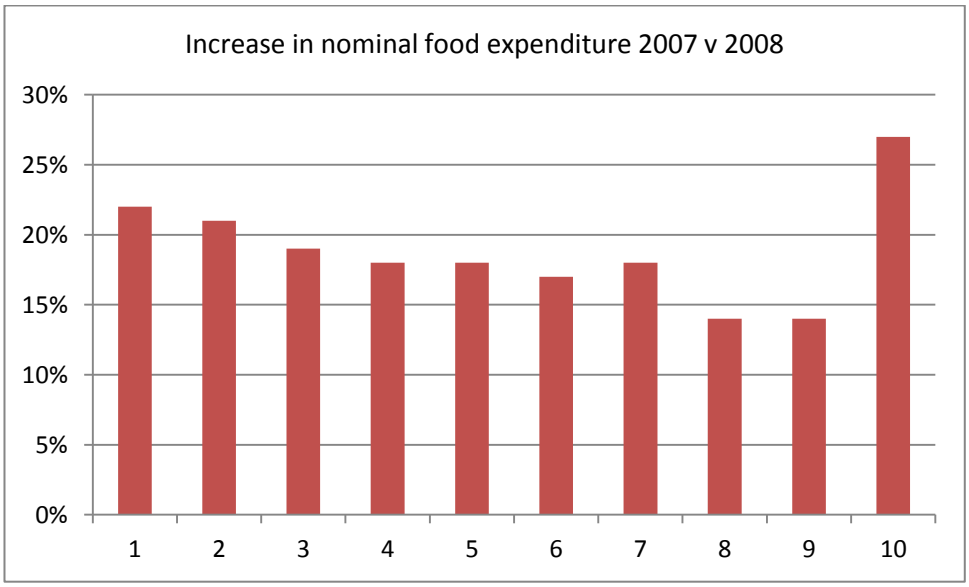
Table 4.4.3 Oil rents, tax revenues and GDP growth, 2007-2009

Year	Tax as % of Gov. revenue	Oil Rent as % of Gov. revenue	GDP growth %	Deflated (2004 Riyals) mean urban household expenditure[57]
2007	13	33	7.8	57,523,939
2008	16	38	2.3	52,918,712
2009	19	21	1.8	50,738,916

Source for tax, oil rents and GDP growth: World Bank

Apart from the significant fall in the income share of the top decile, we can further verify that the richest group is behind the observed fall in inequality, by comparing one 'discretionary' and one 'non-discretionary' expenditure category between 2007 and 2008. Let us assume that food expenditure is non-discretionary in the most part and unlikely to be affected (especially for the rich) by a downturn in economic circumstances. From figure 4.4.6 it is evident that nominal food expenditure increases for the rich as well as the poor in 2008.

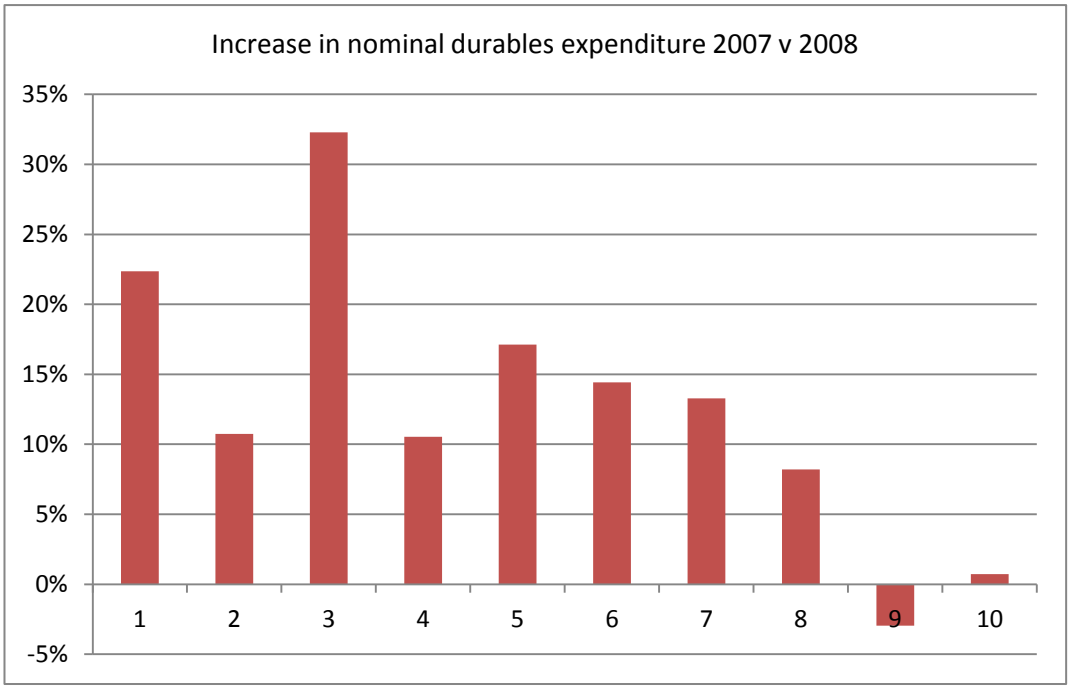
Figure 4.4.6 Increase in urban household food expenditure 2007 v 2008



[57] The mean urban household expenditures have not been scaled as we wish to look at absolute amounts not the distribution in this case.

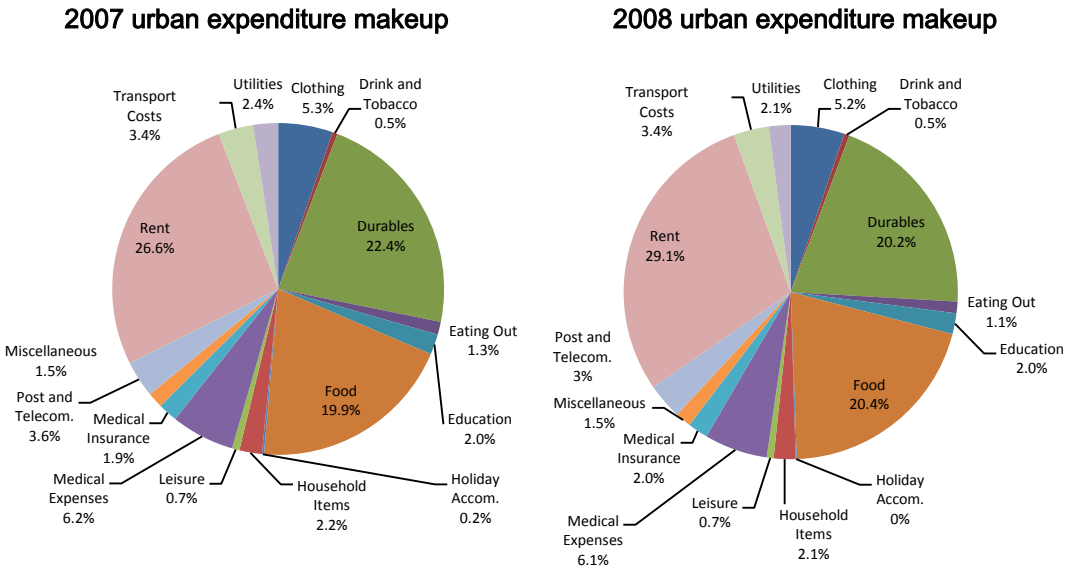
Let us now turn our attention to one of the largest discretionary expenditure categories, 'durables' (20% of all expenditures). We can see from figure 4.4.7 that the top two richest deciles have increased their expenditure less than any other income group in nominal terms. Their expenditure has actually substantially fallen in real terms. This is also reflected in the overall share of durables in expenditures which decreases from 22.4% in 2007 to 20.3% in 2008.

Figure 4.4.7 **Increase in urban household durables expenditure 2007 v 2008**



Apart from the economic downturn affecting the rich, it is also noteworthy that expenditures on rent increased substantially in nominal terms between 2007 and 2008. Rent accounted for 29% of all expenditures in 2008, up from 26.5% in 2007. The nominal rental expenditure increase for the top decile was just 13%, half the increase of any other decile. This would also contribute to the decrease in the inequality measure.

Figure 4.4.8 2007 v 2008 urban expenditure makeup



We can conclude that the fall in the headline inequality figure in 2008 is not due to the introduction of fuel rationing and is simply due to a general loss of discretionary expenditure share by the richest decile.

To conclude this section and consolidate our findings we run a regression, for the years 1997 to 2007, based on a functional form cited by Pesaran (1976), attributed to Ahluwalia (1974)[58], used initially for an "explanation of the crosscountry [sic] evidence on income distribution."

GINI = $\beta_0 + \beta_1 y + \beta_2 y^2 + \beta_3 ur$

Where

y is the log mean household expenditure[59]

ur is the uran:rural expenditure ratio

[58] *Ahluwalia*, "*Income Inequality*: Some Dimensions of the Problem," in H. Chenery, et al., eds., Redistribution with Growth (London: Oxford University Press, 1974)

[59] Please note that for the mean household expenditure, we use household data without scaling for household size as we are no longer looking at distribution, but the annual mean.

The quadratic shape of the equation is due to testing for the inverted U shaped Kuznets relationship of inequality and growth. Detailed results are provided in the appendix.

GINI = $20.84 - 2.34y + 0.07y^2 + 0.08ur$

R^2, unadjusted: 0.66

R^2, adjusted: 0.52

The (y) coefficients do no correspond with a Kuznet's inverted U shape and are not significant. Only the p-value of the urban to rural ratio is found to be significant[60]. We would indeed expect this variable to be explanatory of the inequality figure. The inclusion of an additional variable of government expenditure lowers the adjusted R^2 and is not significant in explaining the change in inequality. Full results of the regression are in appendix 4D.

For the 1997-2007 period, growth (measured in terms of real expenditure) and government expenditures do not seem to directly affect changes in income inequality. However, as the urban/rural divide seems to be a good indicator of such changes, we go on to investigate whether government expenditure is favouring one sector over another.

[60] UR has a P-value of 0.0076

4.5 Investigating the urban bias

Urban bias is a term popularized by Lipton (1977) and used by Bates (1981) in his critique of African government policies to the detriment of local farmers. The term specifically refers to worsening terms of trade in the agricultural sector when the manufacturing sector is protected. We opt for a more general political economy definition of 'urban bias' (Eastwood and Lipton 2002), also encompassing distributional urban bias of "unmerited public spending on goods and services in urban as compared to rural areas" (Corbridge and Jones 2008, p. 3).

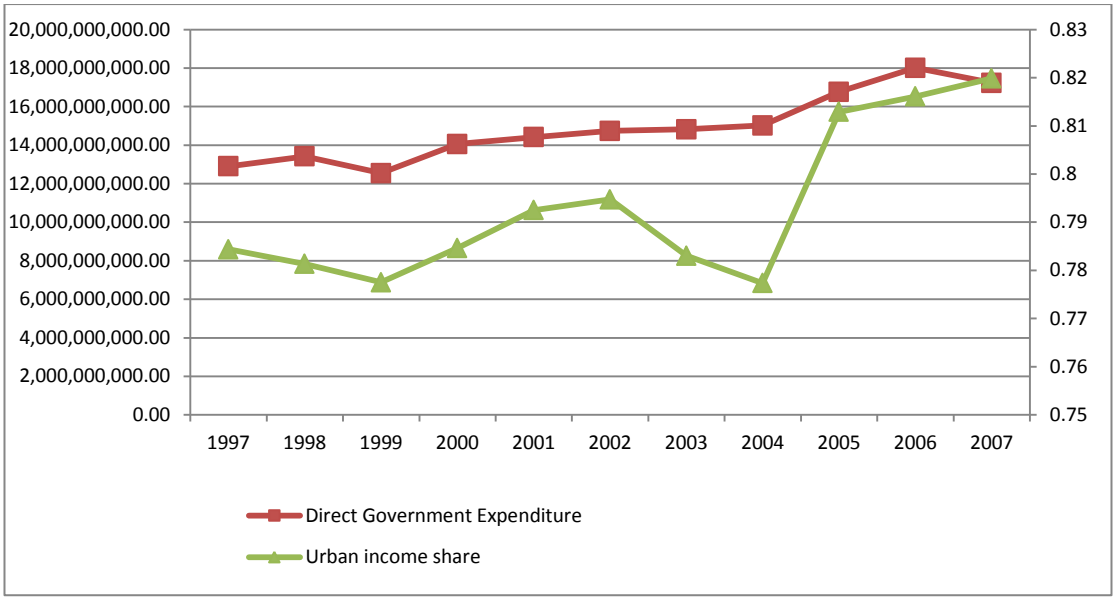
Our contention that government expenditure in Iran's oil economy favours the urban sector can be investigated by comparing the fluctuations calculated in the annual urban household expenditure share to those of government expenditure[61]. Even at first glance there is an apparent link between the two. Changes in government expenditure seem to be mirrored by changes in urban income share. For example a fall in 1998 to 1999 leads to a fall in urban income share and a sudden rise in 2004 to 2005 or a rise from 1999 to 2000 leads to a rise in urban income share. The table comparing the two measures is provided in appendix 4E.

Figure 4.5.1 Government final consumption expenditure and urban income share

Constant $US (year 2000)[62]

[61] The reason we have chosen not to focus on oil prices or revenues and opted for final government consumption expenditure as a variable, is due to annual oil revenue proceeds not being wholly, immediately or automatically included in the government's annual budget. Therefore, on the understanding that oil rents account for a substantial portion of revenues, annual direct government expenditures are considered rather than annual oil rents.

[62] Source World Bank, definition: "General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation."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Direct Government Expenditure
Urban income share

If we assume a simple linear relationship between the log of government final consumption expenditure (GOV) and urban income share (UI), we derive the following results for 1997 to 2007. Details of the regression are provided in the appendix 4F.

UI = $\beta_0 + \beta_1 GOV + u$

UI = -1.98 + 0.19GOV

R^2, unadjusted: 0.7614

R^2, adjusted: 0.7349

Both the constant and government expenditure variable coefficients are significant. This is not to suggest that government expenditure is necessarily the only driving force behind the rise in urban income share, but it does seem to indicate it is one of the main factors behind both the growth and the downturns in the urban share of income.

4.6 Changes within the income distribution

Although the GINI coefficient has provided a number of valuable insights, it does not differentiate between the inequality at the bottom and top of the income scale. In order to delve deeper into the fluctuations of inequality for the period under study, we turn to the Generalized Entropy (GE) inequality measures. The formula for the family of General Entropy measures (GE) is given as:

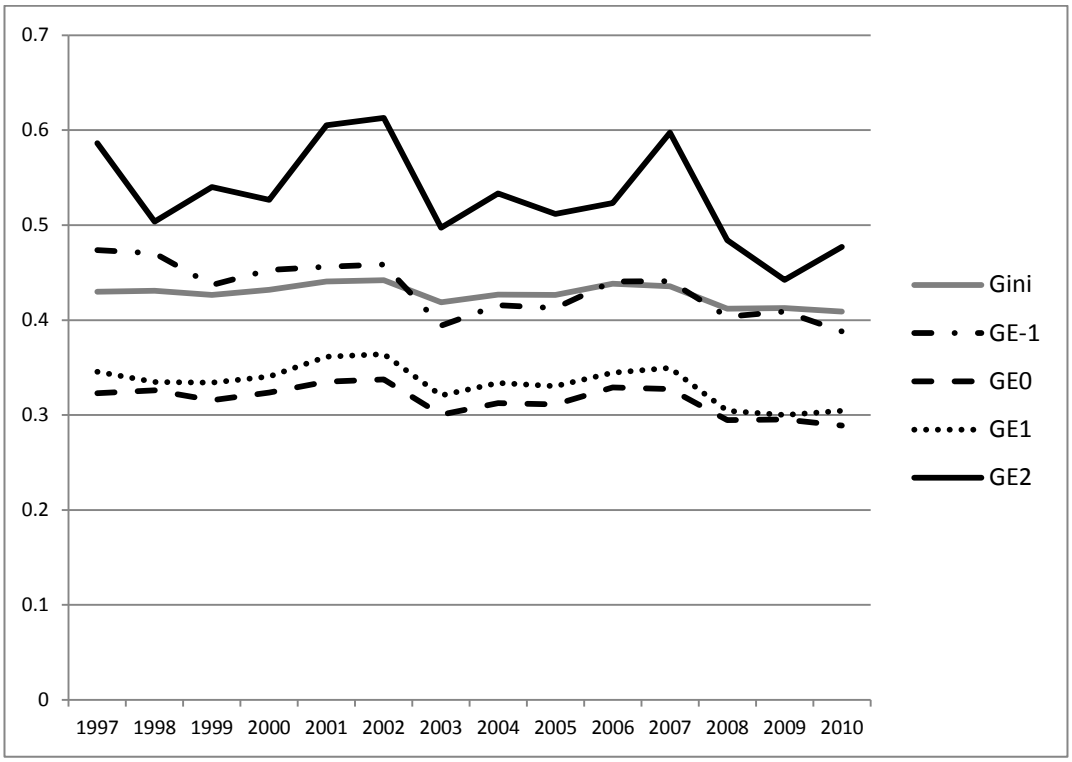
$$GE(\alpha) = \frac{1}{\alpha(\alpha - 1)} \left[\frac{1}{N} \sum_{i=-1}^{N} \left(\frac{y_i}{\bar{y}} \right)^{\alpha} - 1 \right]$$

GE is often used for carrying out inequality analysis where additive decomposition is a requirement, but it is also useful as it can show differing sensitivities towards different parts of the distribution. For lower values of α, the GE measure is more sensitive to changes in the lower income household expenditures and for higher values of α (more than 1) more sensitive to changes in the higher income households. Table 4.6.1 presents the results of the calculated GE values for the period under study.

Table 4.6.1 GE measures for household equivalence expenditure, 1997-2009

Year	GINI	GE-1	GE0	GE1	GE2
1997	0.42996	0.47371	0.32299	0.34542	0.58642
1998	0.43102	0.47045	0.32606	0.33485	0.50357
1999	0.42637	0.43695	0.31565	0.33422	0.54025
2000	0.43181	0.45289	0.32363	0.34047	0.52669
2001	0.44059	0.45611	0.33519	0.3615	0.60519
2002	0.44189	0.45847	0.33737	0.36405	0.61293
2003	0.41878	0.39411	0.30031	0.32049	0.49718
2004	0.4269	0.41554	0.31237	0.33368	0.53334
2005	0.42647	0.41255	0.31126	0.33036	0.51186
2006	0.43819	0.4406	0.32901	0.34455	0.52317
2007	0.43569	0.44112	0.32733	0.34948	0.59754
2008	0.41189	0.4037	0.29458	0.30445	0.48408
2009	0.41258	0.40896	0.29543	0.29996	0.4424
2010	0.40906	0.38803	0.28901	0.30427	0.47708

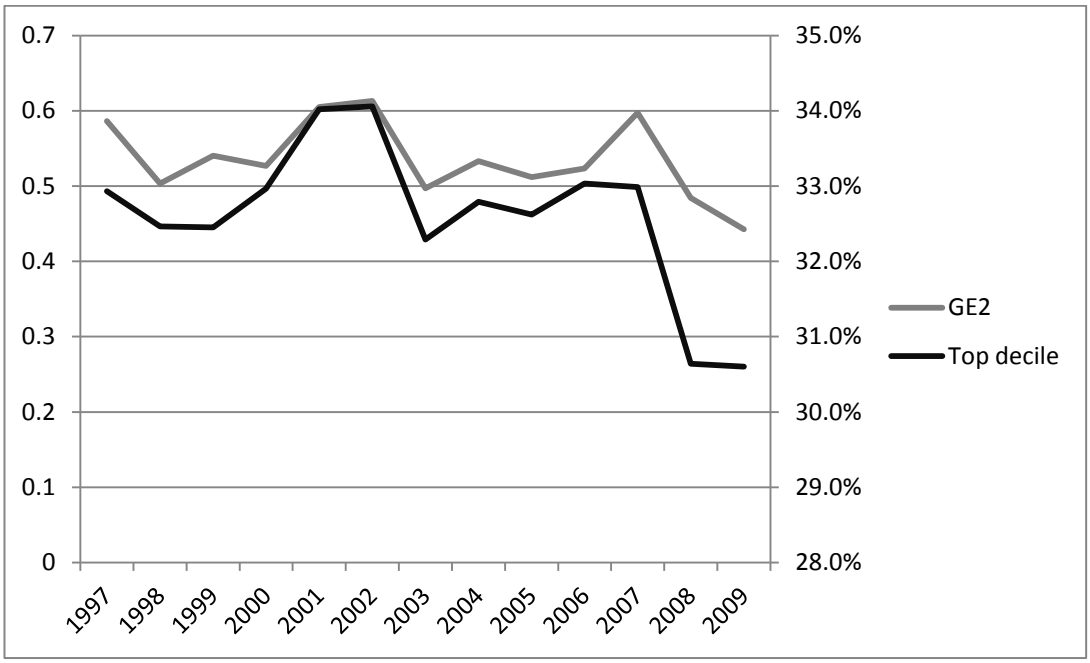
Figure 4.6.1 GE measures for household equivalence expenditure, 1997-2009



As can be seen from Figure 4.6.1, apart from GE(2) all the other GE measures display minimal variance and follow the GINI pattern during this period. The GE(2) measure, is clearly more erratic. This seems to suggest that the small fluctuations observed in overall inequality could largely be due to or reflected in the income changes among the top earners in Iran. Intuitively, this can be explained by a small subset of the population having a disproportionately large share of the total income and changes mainly in this group's fortunes impacting the year on year inequality changes. To investigate this further, the top income decile of the households can be looked at in more detail.

The pattern of income share of the top decile should follow a similar pattern as that of the GE(2) inequality measure given that it is more sensitive to the changes in the income of the rich. Figure 4.6.2 confirms this.

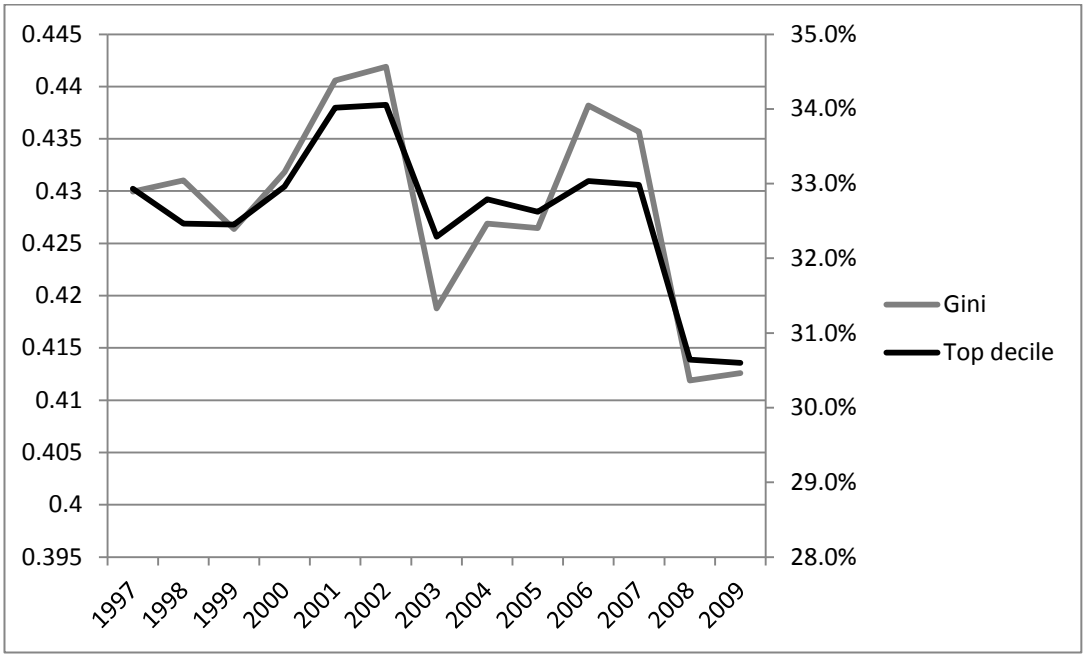
Figure 4.6.2 Top decile income share and the GE(2) inequality measure, 1997-2009



As GE(2) is the only 'erratic' GE inequality measure during this period, it follows that changes in the top decile should also dominate changes in the overall GINI figure. To investigate this, in figure 4.6.3 the top decile of the equivalence household expenditure share is compared to the overall GINI figure, which is equally sensitive to lower and upper levels of the income distribution. The table of data for a comparison of the top decile and GINI is provided in appendix 4H.

Correlating the top decile with the GINI or GE(2) figure is problematic as we are comparing movements in a slice of the distribution with the whole distribution. This can lead to misleading results, as changes in the bottom decile will also affect the income slice of the top decile. Therefore a simple correlation of this type is not sufficient to alert us to the income groups which are mostly responsible for fluctuations in the overall distribution. However, in combination with the findings from the General Entropy measures, in this case the GE(2) measure, it is possible to conclude that small fluctuations in overall year on year inequality are mostly due to or reflected in the expenditure levels of the higher income earners.

Figure 4.6.3 Top equivalence expenditure decile and the GINI coefficient



As figure 4.2.3 clearly shows the top decile expenditure share seems to be almost perfectly correlated to the GINI figure. In fact there is a 0.95[63] positive correlation between the two. As explained earlier, on its own such a correlation would be misleading and inconclusive, as a change in one slice of the pie will also affect the other slices of the pie, but in combination with the GE(2) finding it is worthy of note.[64]

Table 4.6.2 Urban GINI Measurements, 2007

Overall Urban GINI	0.40758
Urban GINI without the top decile	0.30394
Urban GINI without the bottom decile	0.37585

[63] A correlation of 0.9491 significant at the 1% level.

[64] To illustrate this, the correlation for the bottom 6 deciles which accounts for 60% of the population and approx 30% of the income share (i.e. equivalent to the top decile in terms of income share but 6 times the population) also correlate almost perfectly but negatively at -0.98 with the GINI figure. However, the GE measure sensitive to the bottom end of the income scale shows little fluctuation for the period under study.

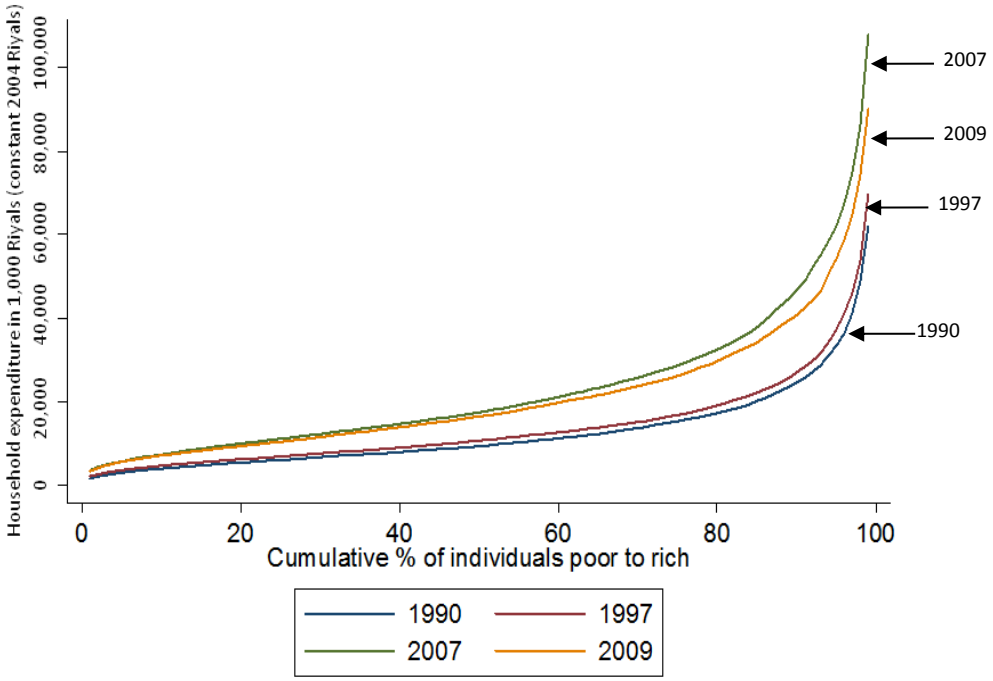
Although not directly related to the 'movements' in the year on year inequality figures, the dominance of the top decile in the overall GINI figure can also be illustrated by removing the top decile from the measurement. For the year 2007, the calculated GINI figure for the urban areas is 0.40758. Removing the top decile leaves us with a GINI figure of 0.30394. Removing the poorest decile results in a GINI figure of 0.37585. The consensus from the measurements in this section is that the observed '*fluctuations'* in Iran's income inequality year on year are manifested mostly in the plight of the rich.

4.7 Evolution of income distribution

The calculated GINI and GE figures provide an overview of inequality during the period under study, but in order to start delving into the distribution pattern of the observed inequality over time, we make use of a 'Pen Parade' which in this case simply shows the expenditure per household sorted by scale. The horizontal axis ranks households from poorest to richest and the vertical access displays the level of household expenditures. A Pen Parade is particularly useful for comparing two distributions over time (Haughton and Khandker, 2009).

We have selected four years to compare the evolution of the income inequality pattern, 1990, 1997, 2007 and 2009. Separate urban and rural Consumer Price Indexes for Iran have been used to deflate the urban and rural expenditure data. The urban CPI is derived from the website of the Central Bank of Iran (www.cbi.ir) and the rural CPI from the website of the Statistical Center of Iran (www.amar.org.ir). A table of the rural and urban deflators is provided in appendix 4I. Rural CPI figures were not available for 2009 and hence this year was omitted from the rural Pen Parade analysis.

Figure 4.7.1 Pen's Parade Urban household expenditure, urban households



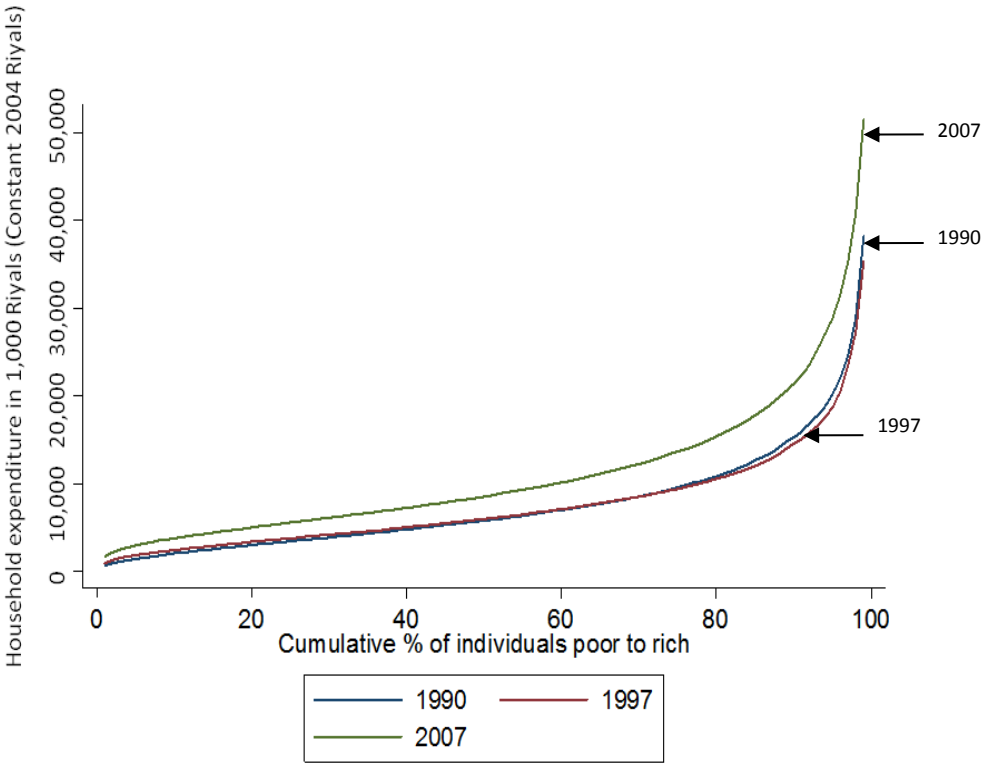
As can be seen, between 1990 and 1997 (during Rafsanjani's administration) there is only a very slight rise in real household expenditures and the income distribution does not alter substantially. Between 1997 and 2007 (Khatami's government and 2 years into Ahmadinejad's government) there is a significant rise in real urban household expenditures without a significant increase in income inequality[65]. The whole distribution moves up to a higher income scale, so that the poorer household are also better off.

In 2009 (following the global financial crisis), there is a fall in real household expenditures. But looking at the Pen's Parade this seems to occur for the richer households not the poorest ones. In fact an analysis of deciles shows that the poorest quintile (marginally) gains income share. This is partly reflected in the improvement of the urban income distribution GINI figure, from a coefficient of 0.408 in 2007 to 0.382 in 2009. It is therefore interesting to note that not only has urban income inequality not increased during

[65] The GINI figure does slightly worsen, from a GINI of 0.43 to 0.436.

periods of growth in terms of real expenditures, but during a fall of real expenditures it has actually benefitted the 'non-rich' households.

Figure 4.7.2 Pen's Parade Rural household expenditure, rural households



From Figure 4.7.2 it is evident that there is no significant increase in rural household expenditures between 1990 and 1997. There seems to be a small rise in expenditures for the very poor and a fall for the rich, with households in the middle income range remaining the same. This should of course improve overall rural income distribution, as indeed is confirmed by the rural GINI coefficient of 0.4268 for 1990 and 0.39405 in 1997. Notice how the comparison of the rural GINI figure, though indicating a fall in inequality, does not in itself reveal the intricate nature of the change in the distribution.

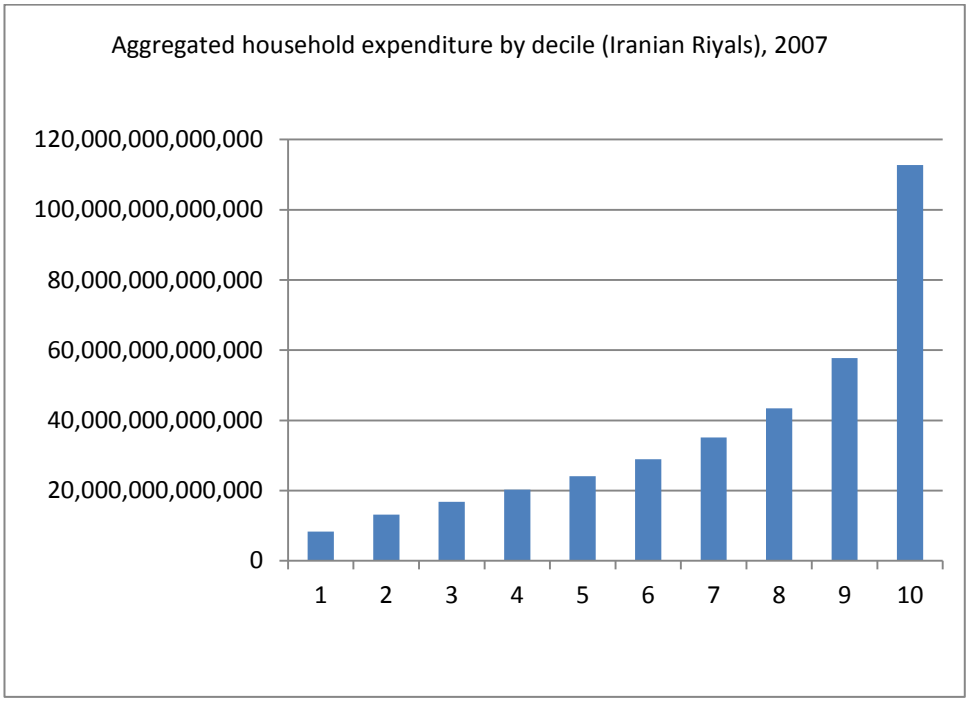
Between 1997 and 2007 there is a significant increase of household expenditures across the entire income range. The overall distribution is unchanged as confirmed by the rural GINI coefficient of 0.39308 for 2007.

For the period under study, there is a real rise in real expenditures for both urban and rural areas. Following the 2008 fall in real expenditures, it is the rich who bear the brunt in relative terms rather than the poor. This again confirms that it is the plight of the rich which mostly affects fluctuations in the inequality figure.

4.7.1 Household expenditure decile shares, 1997-2010

Following from the Pen Parade, we turn our attention to decile analysis, an intuitively simple measurement tool, to estimate the share of expenditure by each decile. This allows us to see how differently ranked groups within the income distribution have fared throughout the period under study. The table of urban and rural deciles is in appendix 4J and 4K.

Figure 4.7.3 Decile expenditures, urban households 2007

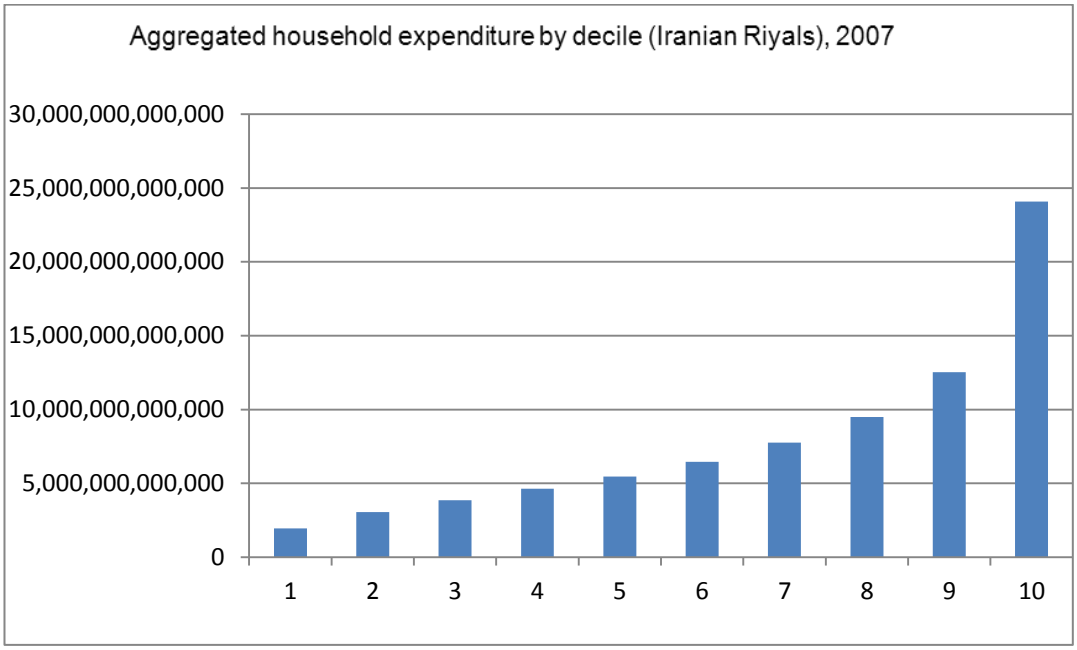


In 2007, the richest urban decile spent more than 13 times the poorest decile.[66] For the rural sector the discrepancy was almost the same, with the richest households spending 12 times the poorest. In both the urban and rural sectors, the top decile dominates, accounting for

[66] Methodology footnote: These figures are not exaggerated by having used equivalence scales. The same calculation was carried out on the household expenditure without the use of equivalence scales and the ratio of the richest to the poorest decile was in fact 14.2

more than 30% of all expenditures. It spends almost twice the next lower placed decile (9th decile).

Figure 4.7.4 Decile expenditures, rural households 2007



Decile shares, 1997-2010

Figure 4.7.5 provides a weighted aggregate of urban and rural decile shares

Figure 4.7.5 Total (urban and rural) household expenditure decile shares, 1997-2010

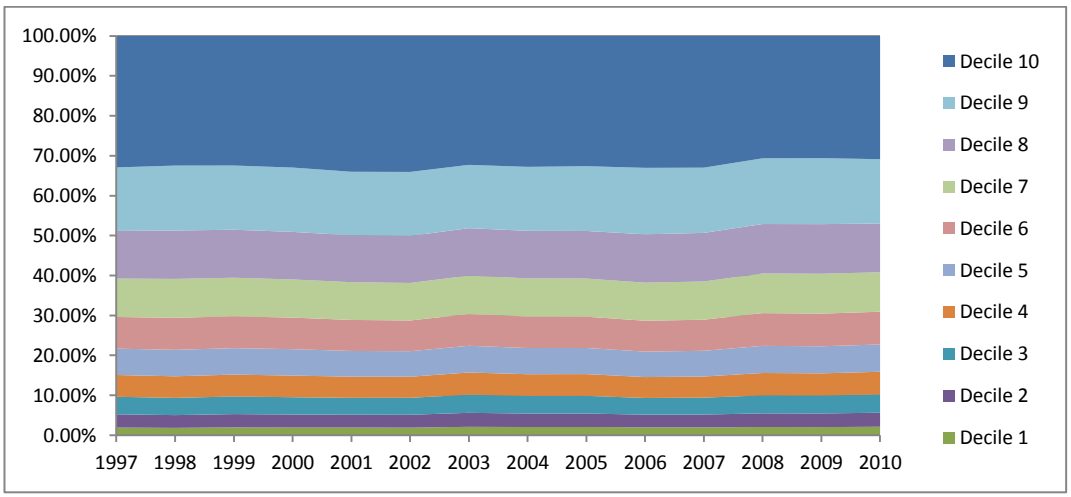


Table is provided in appendix 4L.

All in all, there is not a significant shifting of income shares during this period. Between 1997 and 2010, the top decile has lost its income share by two percentage points from 32.9% to 30.9%. The poorest decile's share has slightly improved from 1.9% to 2.1%. The middle class have been the biggest relative winners, although by a small absolute gain. The middle 40% of the household population share has moved from a share of 29.6% of total expenditures to 30.6%. However, given the number of expenditure share fluctuations within this period, these figures should be interpreted with caution. For example the loss of the top decile's income share occurs suddenly in 2008 and coincides with the global financial crisis and this could be reversed in later years and may not be part of a general trend of the rich losing income share.

We can conclude that, unlike previous studies on Iran (Salehi-Isfahani, 2006b, p.25, Tabibian, 2000, pp.152-158) which have found a shift of income in favour of the very poor at the expense of the rich, the decile analysis in our study reveals no discernible shifts in income shares during the 1997-2010 period, apart from highlighting the sudden loss of income share by the top decile in 2008. As we have already seen, this also coincides with a sudden fall in the GINI index.

4.8 The effect of subsidies on income inequality

Until recently (Dec 2010) Iran had in place a vast subsidies program on basic food and energy items. While in theory the subsidies were in place to help the poor, government officials argued that in practice, they were leading to wastage of resources and their untargeted nature meant that all income groups, not just the poor, were being subsidized (Guillaume et al., 2011).

The lifting of subsidies is politically sensitive in Iran as any improvement in inequality may adversely affect the poor. Salehi-Isfahani (2010) argues that although subsidies may benefit the rich more in absolute terms, in relative terms (as a % of their total expenditure) the poor benefit the most from subsidies. Lifting general subsidies may therefore hurt the poor if compensatory payments are not sufficient and not properly targeted. Since late 2010, Iran's government has started to remove many of the subsidies and make fixed monthly cash payments in compensation to families (in total 61 million people, 80% of population) who have completed a self-assessment form(Guillaume et al., 2011).

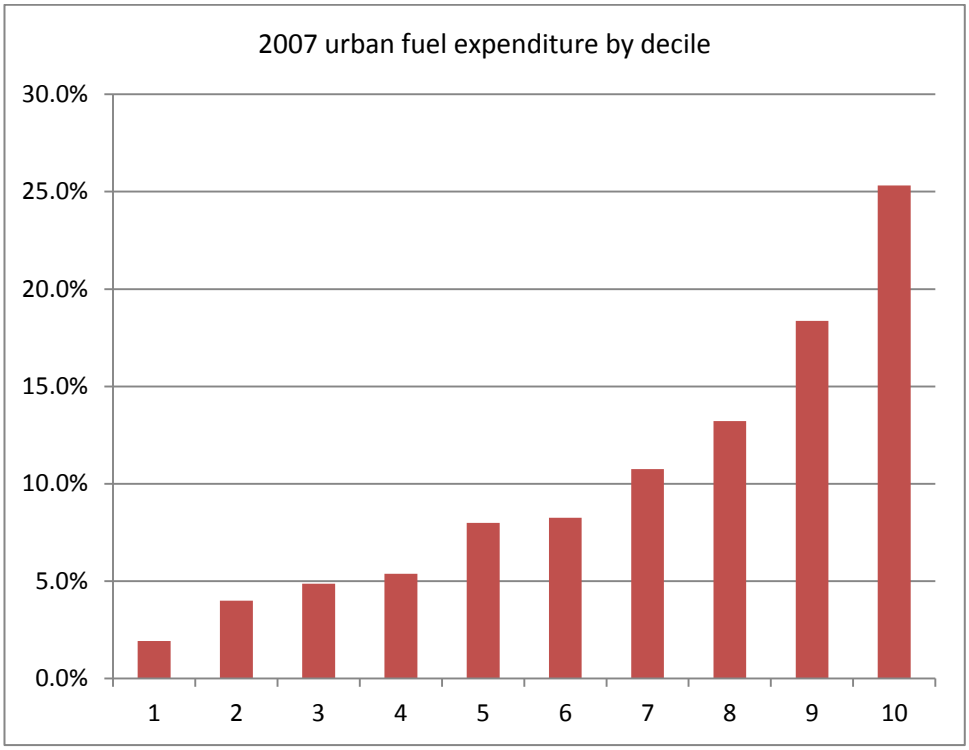
As of July 2012, these cash payments are still not targeted, but the next phase of the program aims to target the cash payments to the neediest. It should be noted, that recent international sanctions and oil embargoes have led to a significant depreciation in the Iranian Riyal, which means that many goods are once again subsidized in real international price terms unless their domestic price is raised even further. It is too early to assess the impact of lifting subsidies on inequality using household surveys, as the datasets are not publicly available yet. However, we can briefly assess the effect the subsidies were having on income inequality prior to their lifting by looking at the two heavily subsidized goods of fuel and electricity. We will use the 2007 dataset for this purpose. Tabibian (2000) carries out a similar study for the year 1996.

4.8.1 Fuel and electricity subsidies

We will first take a look at transportation fuel expenditure for 2007. We have included expenditures relating specifically to petrol, gas oil (a type of diesel fuel for transportation) and gas (for gas powered vehicles). In 2007 fuel subsidies were still prevalent. Although subsidized fuel was rationed from July 2007, the ration was a generous 120 litters per month for every car. This was gradually lowered and limited to certain models of cars in the following years.

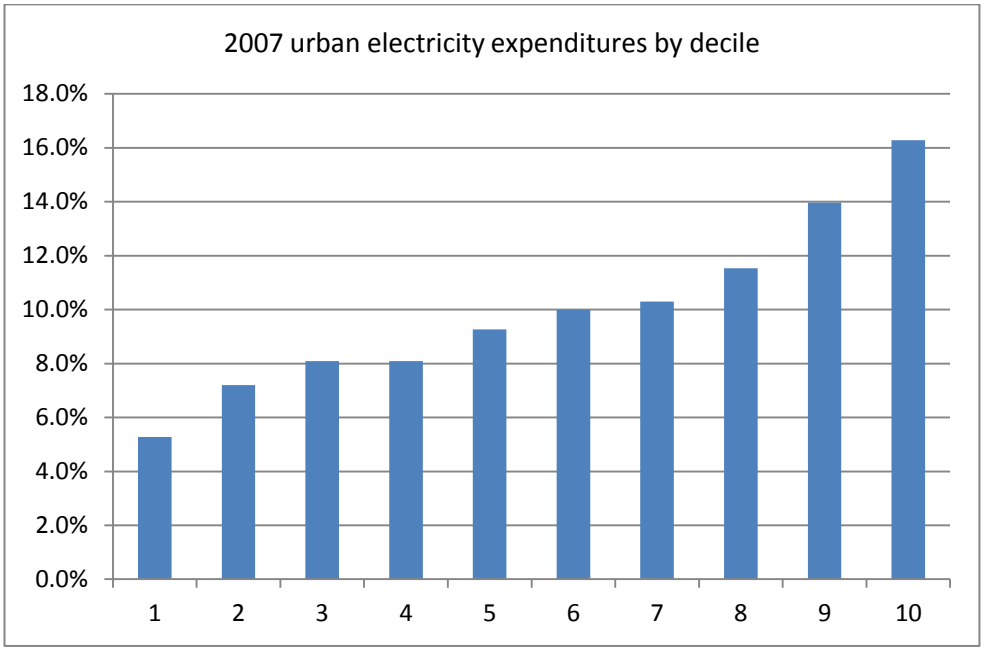
If we break down expenditure on transport fuel by overall household expenditure deciles, we will see which income ranges are benefitting the most from the fuel subsidies. For this particular analysis, we make use of non-scaled fuel expenditure as we wish to look at actual fuel usage per household, but we make use of scaled total household expenditure to determine a more accurate household decile distribution. The table of results is provided in appendix 4M.

Figure 4.8.1 Aggregate urban fuel expenditure by decile, 2007



Although the subsidies are implemented to help the poor, due to their untargeted nature, the richest households are the main beneficiaries in absolute terms. More than 25% of fuel subsidies accrue to the richest 10% and less than 2% of the subsidies benefit the poorest 10% of households. Intuitively, it is the rich who have the most usage of fuel driven vehicles.

Figure 4.8.2 Aggregate urban electricity expenditure by decile, 2007



A similar exercise was carried out for electricity usage in 2007. Again, electricity costs were not scaled so that actual usage could be determined. The table of findings is provided in appendix 4N. The results demonstrate that electricity subsidies are not as pronounced as fuel subsidies, but still favour the richer deciles disproportionately. We can therefore conclude that, given the rather large premise of compensatory payments being sufficiently high and being targeted accurately, the lifting of subsidies should benefit the poorest deciles.

4.9 Geographic decomposition of vertical inequality

We now wish to look at the geographic breakdown of the observed inequality. In particular, to find out how much the urban and rural sectors contribute to overall inequality. We have already established that the urban/rural divide seems a factor in the observed inequality fluctuations, we can now also calculate how much of the underlying inequality can be apportioned to the gap in incomes between these two sectors.

The decomposition of inequality can provide valuable insight into the structure of income distribution (Litchfield, 1999). A geographic decomposition can help target present and future government policy, by revealing emerging trends in the contribution of specific regions to overall inequality. Typically, researchers decompose inequality by distinct population groups and measure the inequality prevalent within and between those groups. This will indeed be the method adopted by this author. However, this decomposition methodology suffers from a number of limitations two of which should be noted with regards to this research (Morduch and Sicular, 2002b).

Primarily, as regards this research, the lack of control for endogeneity renders the results derived by this method purely descriptive. i.e. a variable which may have led to the observed inequality pattern may have itself been affected by that pattern. Therefore, descriptive interpretations are used rather than deterministic ones in evaluating these findings. Another concern of population decomposition is the number of samples and hence their significance at the end nodes. The more a population is decomposed the smaller the samples become. The end nodes in this analysis are the urban and rural sectors of the individual provinces. However, we do not decompose these into individual towns or districts due to the small sampling problem.

A variety of inequality measures are available for decomposition. Unlike the GINI coefficient, the General Entropy measures offer the characteristic of being decomposable within and between groups (Litchfield, 1999). As explained in chapter three, GE(1), equivalent to the Theil index, has been used to decompose overall inequality into various subgroups.

4.9.1 The urban/rural breakdown

The decomposed Theil index for each year is calculated using equivalence household expenditure data. The observed inequality has in the first instance been decomposed into the three distinct groups of:

1. Inequality within urban areas
2. Inequality within rural areas
3. Inequality between the urban and rural sector.

The full set of results is provided in Appendix 4O.

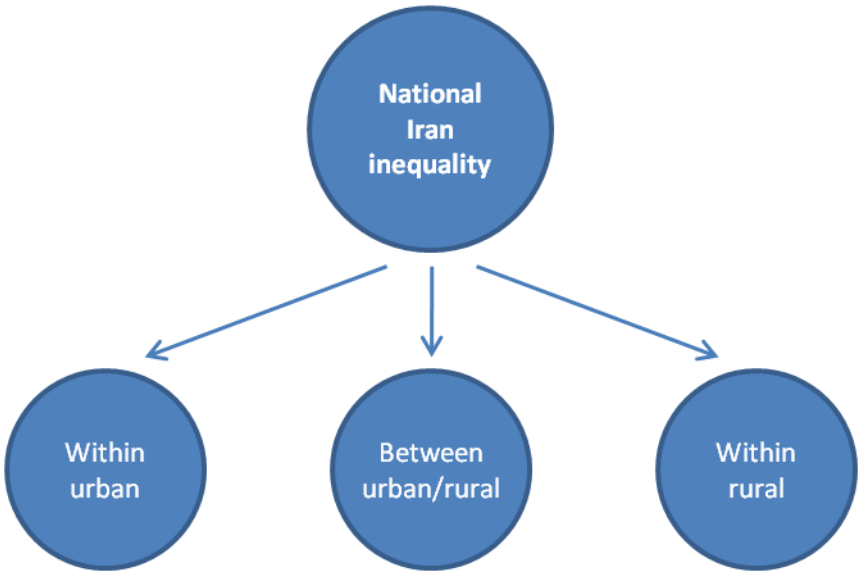
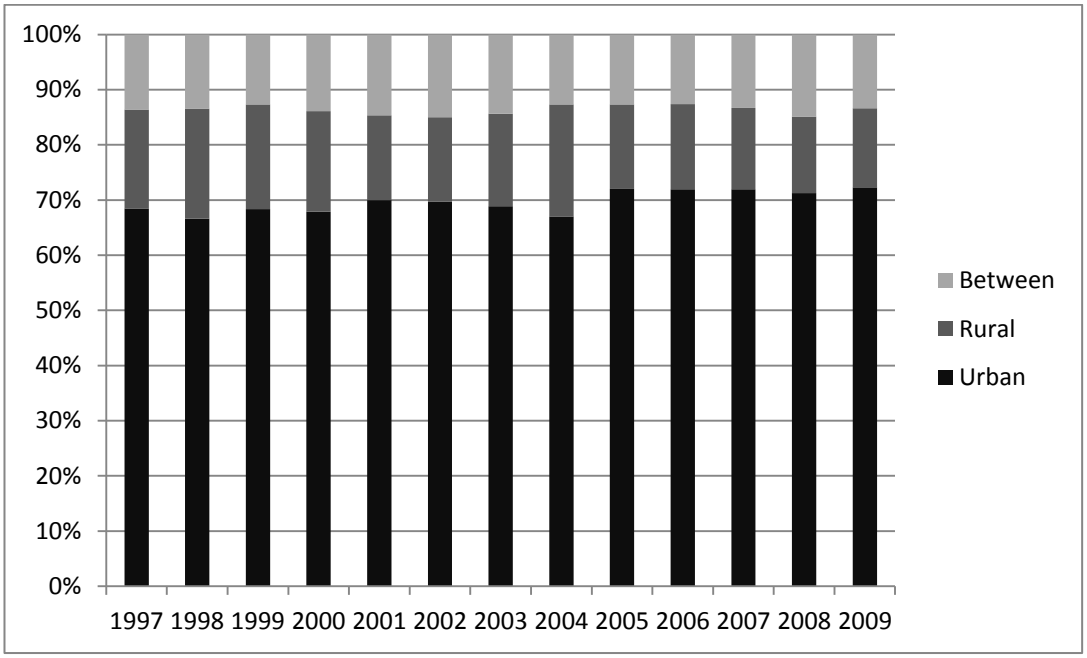


Figure 4.9.1 Contribution to national Iran inequality, urban and rural sectors, 1997-2009



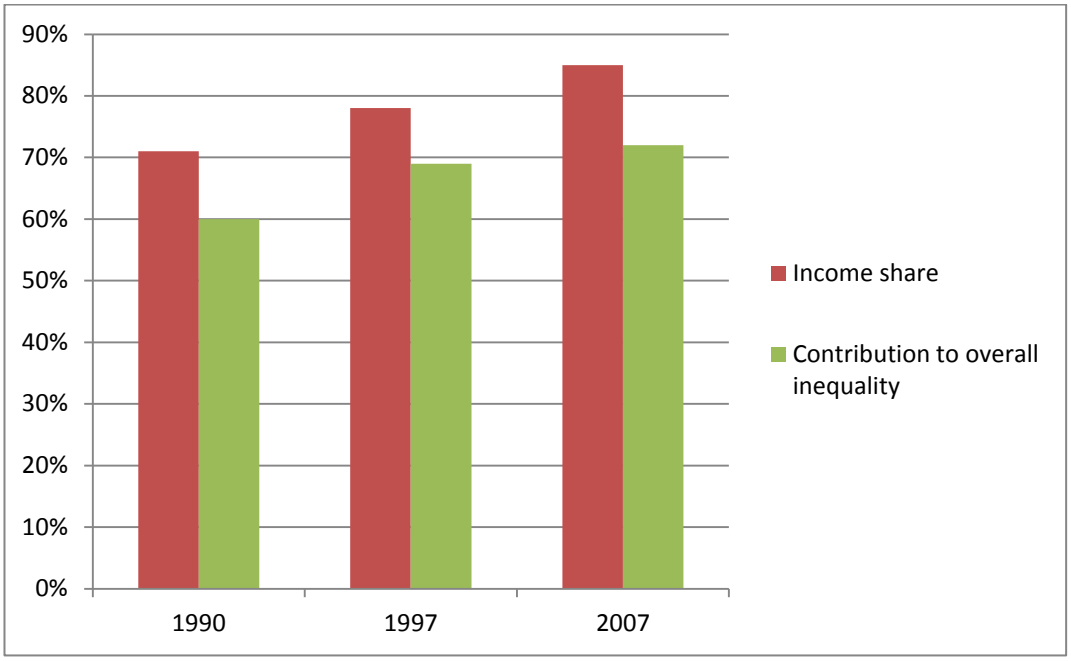
Two significant observations emerge from these findings:

1. There is a consistent trend of a rising population and income share for the urban sector. This is reflected in the urban sector's growing contribution to overall inequality. This rise is not just limited to this period under study. Using the same methodology, we carry out the calculations for 1990 and derive the urban sector's income share as 71% as opposed to 78% in 1997 and 85% in 2009. Clearly the largest and still growing contribution to overall inequality comes from the urban sector.

Table 4.9.1 Urban income share and contribution to overall inequality, 1990, 1997, 2009

Year	Income share	Contribution to overall inequality
1990	71%	60%
1997	78%	69%
2009	85%	72%

Figure 4.9.2 Urban income share and contribution to overall inequality, 1990, 1997, 2009



2. If we take a snapshot of inequality in 1997 and 2007, it is striking that despite a significant fall in the income and population share of the rural sector, and the overall inequality measure being the same, the between inequality contribution of the rural v urban sector has also not changed.

Table 4.9.2 Between rural v urban inequality 1997, 2007

Year	1997	2007
Rural income share	22%	18%
Rural population share	36%	31%
Overall inequality GE(1)	0.345	0.349
Overall inequality GINI	0.430	0.436
Contribution of 'between rural/urban inequality'	13.6%	13.3%

A rural sector with a smaller income and population share still leads to the same 'between' inequality contribution as the one a decade earlier, with overall inequality remaining the

same.[67] At the same time the 'within rural inequality' component of overall rural inequality GE(1) falls during this period from 0.268 in 1997 to 0.249 in 2007.

Using a subset of dummy data to reflect the sample figures, we ran several simulations to see how such a situation can come about. Although there are several possible distribution shifting scenarios, given that within rural inequality decreases during this period but the inequality contribution gap vis a vis the urban sector is preserved, we speculate that the most plausible explanation is that on average the population shift[68] from the rural to the urban sector is dominated by the richest and poorest rural households.

This is given some credence by a study by Mohtadi (1986) who confirms that rural to urban migration in Iran is characterized by both poor and rich migrants. In chapter six we also find that the widest gap between the rural and urban income distributions is for the very poor and the very rich. Intuitively this suggests that the richest have the means to migrate and the poorest do so out of necessity.

4.9.2 The rural urban divide in the richest and poorest decile

It is noteworthy to assess how the shift of the rural population into the urban sector has affected the composition of households in the poorest and richest margins of society. The bottom and top deciles were compared for three years to see how the income and population share was divided between the urban and rural sectors.

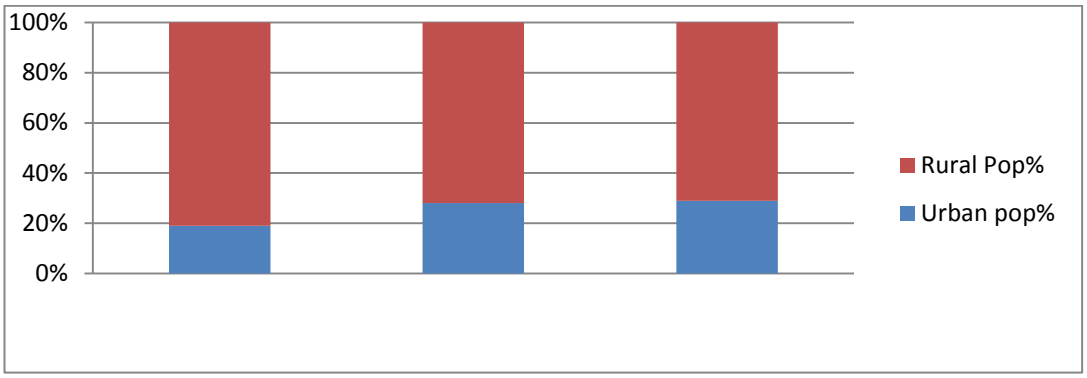
Table 4.9.3 Poorest decile, % of rural and urban income/population share

Year	Urban pop%	Urban income %	Rural Pop%	Rural income %
1990	19%	21%	81%	79%
2007	28%	30%	72%	70%
2009	29%	31%	71%	69%

[67] There have been fluctuations, but the level in 1997 is very similar to that of 2007. There is a very significant fall in GE(1) in 2008 and it stays at the same level in 2009. However, the unmistakable trend of a rise in the urban income and population share alongside a consistent GE(1) measure holds from 1997 to 2007.

[68] This population shift can be both due to migration and urbanization

Figure 4.9.3 Poorest decile, % of rural and urban population share

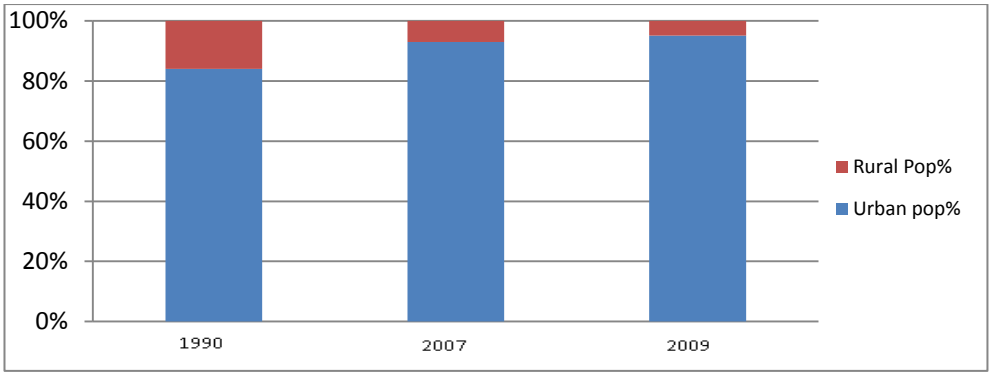


There is a clear trend of increasing urban share in the poorest decile, with nearly a third of the poorest households now being in the urban sector. However, the rural sector still dominates the poorest income decile.

Table 4.9.4 Richest decile, % of rural and urban income/population share

Year	Urban pop%	Urban income %	Rural Pop%	Rural income %
1990	84%	84%	16%	16%
2007	93%	94%	7%	6%
2009	95%	95%	5%	5%

Figure 4.9.4 Richest decile, % of rural and urban population share



The urban's sector dominating share of the top decile has rapidly increased accounting for 95% of all the income. If the population shift to the urban sector continues, urban areas should completely account for the top income decile in the next number of years.

4.9.3 Urban inequality decomposition

Given that the urban sector constitutes the biggest component of overall inequality (72% by 2009), it has been decomposed even further into inequality within all the urban sectors of provinces in Iran and inequality between the urban sectors of the provinces.

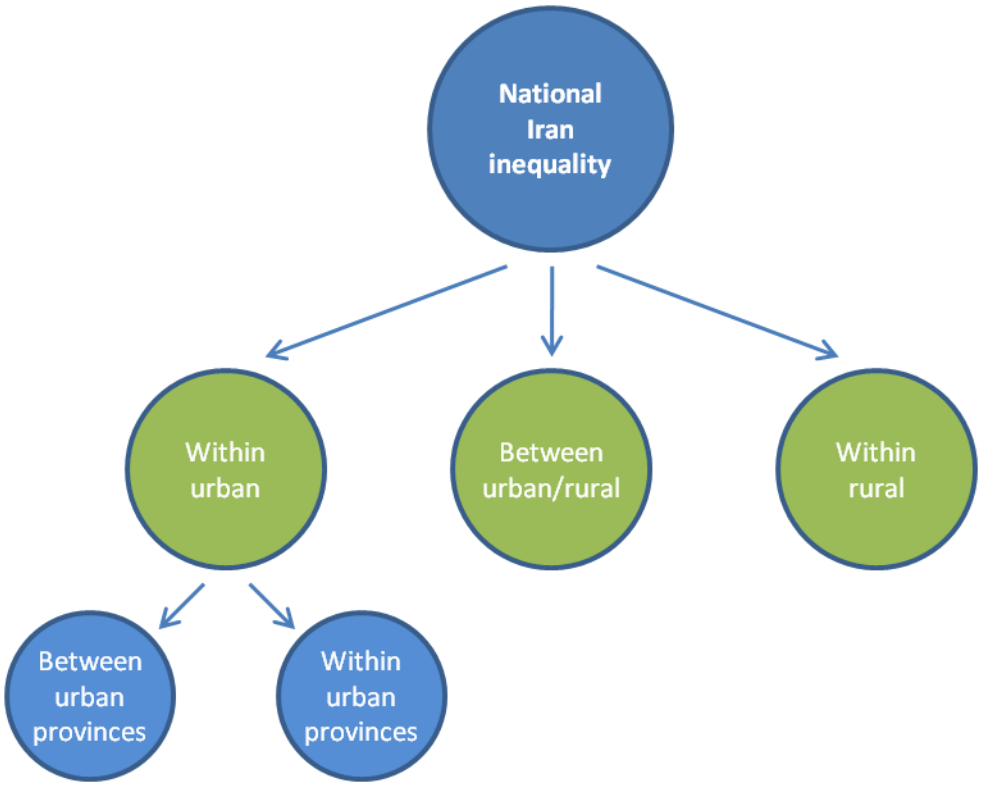
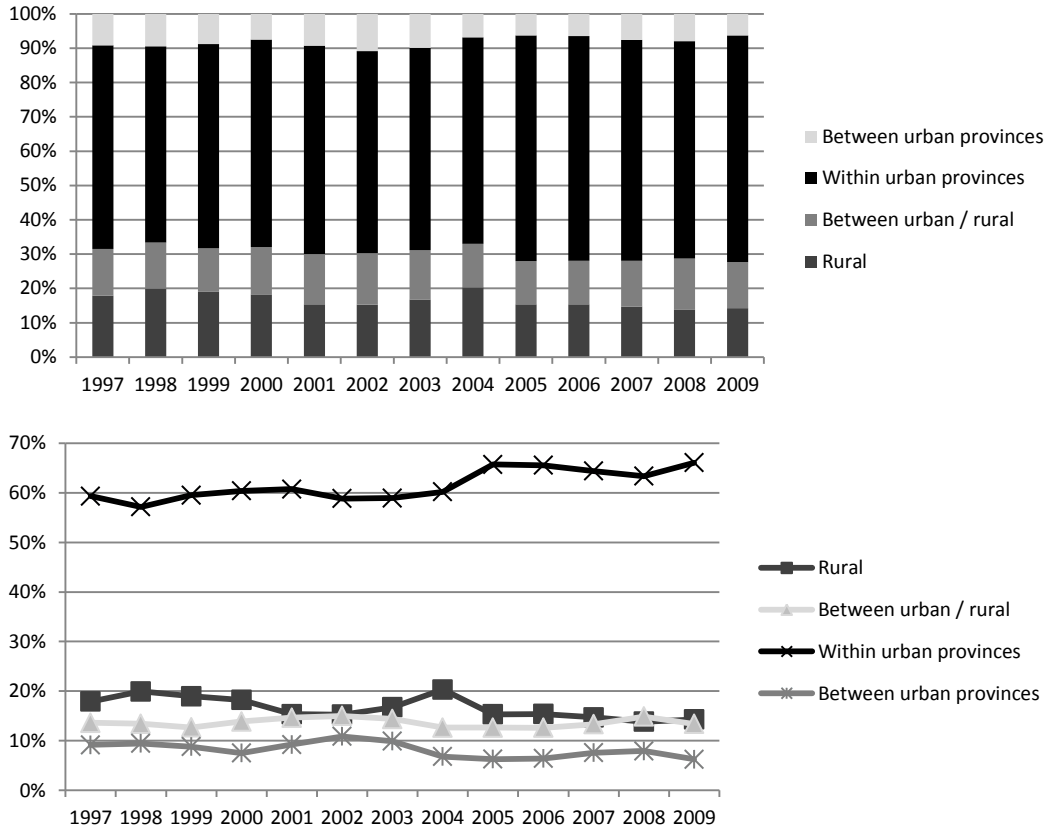


Table 4.9.5 Urban components of overall national inequality

Year	Rural	Between urban / rural	Within urban provinces	Between urban provinces
1997	18%	14%	59.3%	9.2%
1998	20%	13%	57.2%	9.5%
1999	19%	13%	59.5%	8.8%
2000	18%	14%	60.4%	7.5%
2001	15%	15%	60.7%	9.2%
2002	15%	15%	58.8%	10.9%
2003	17%	14%	58.9%	9.9%
2004	20%	13%	60.2%	6.8%
2005	15%	13%	65.7%	6.3%
2006	15%	13%	65.5%	6.4%
2007	15%	13%	64.4%	7.6%
2008	14%	15%	63.3%	7.9%
2009	14%	13%	66.0%	6.3%

Figure 4.9.5 Components of overall national inequality



The most striking pattern is the growing contribution of within provincial urban inequality to overall inequality. From 59.5% in 1999 to 66% in 2009. This is the continuation of an existing trend. The figure for 1990 is 53%. The differences of income within urban areas now account for the major component, two thirds, of overall inequality in Iran.

For 1997-2010, this inequality component is the only driving force behind the urban sector's increasing contribution to inequality, as 'inter provincial urban inequality' has actually decreased from a contribution of 9.2% to 6.3%. While inequality between urban sectors of provinces has actually decreased, the inequality within has increased to the extent that the overall contribution of urban inequality shows a significant increase. This is related to a rising income and population share of the urban sector discussed earlier in this chapter.

Table 4.9.6 Contribution of within inequality in the urban sector to overall inequality

Year	Contribution to overall inequality
1990	53.3%
1997	59.5%
2009	66.0%

4.9.4 Rural breakdown

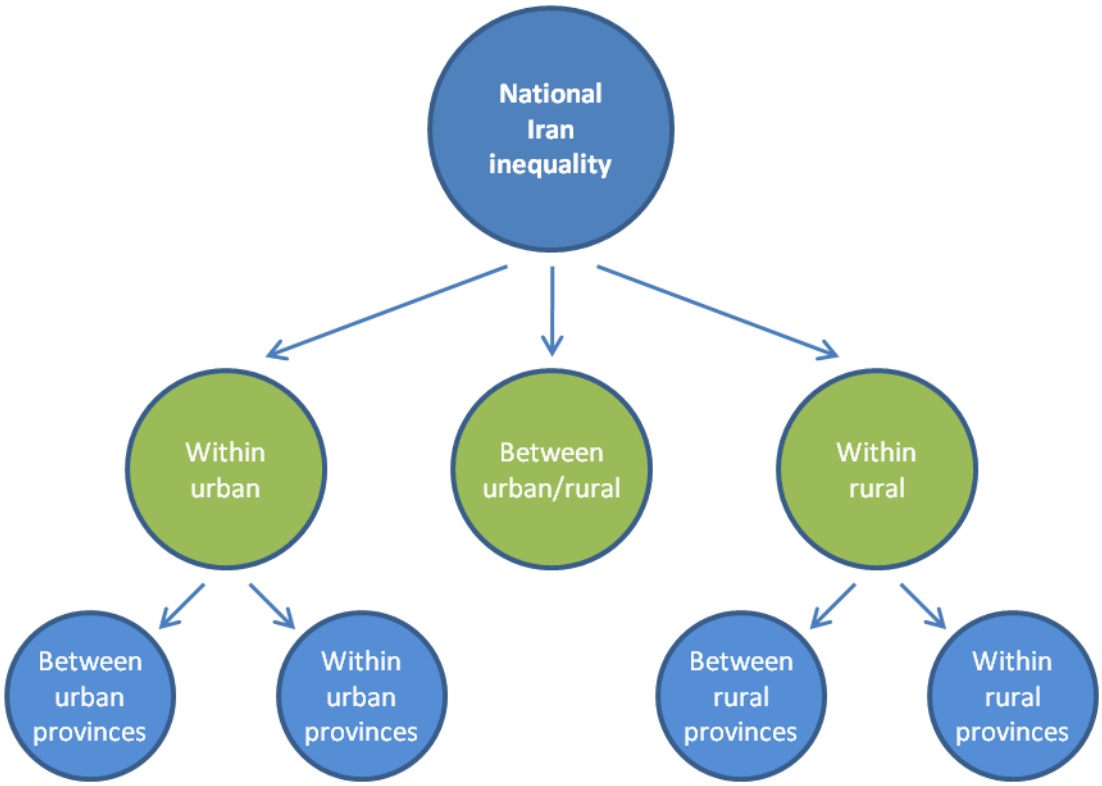
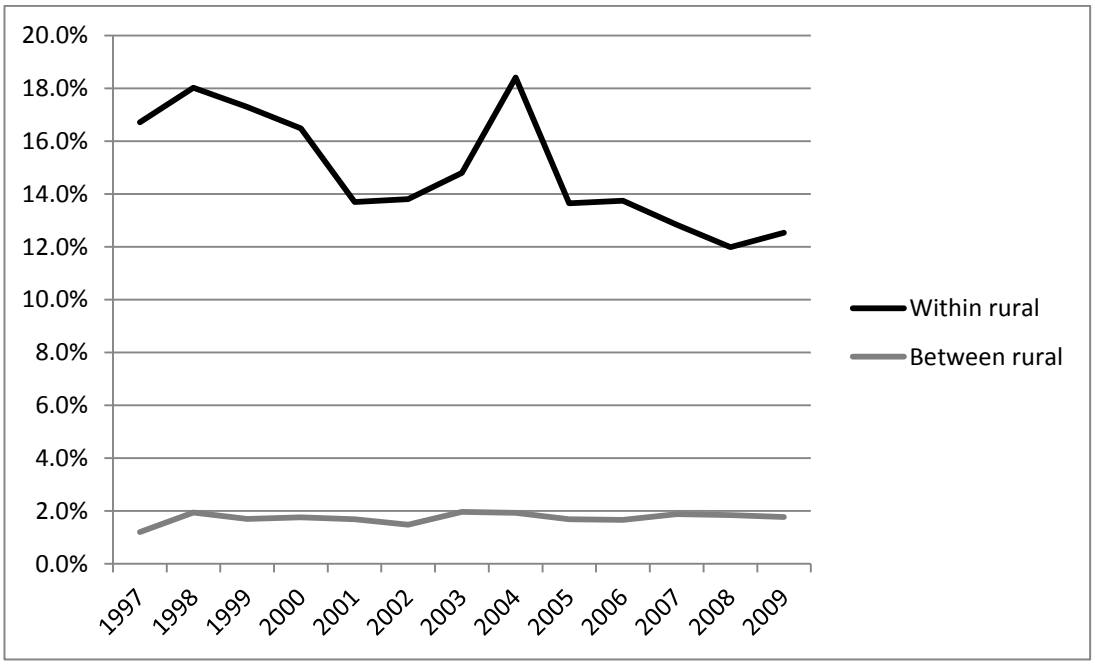


Table 4.9.7 Contribution of within/between rural provincial inequality to overall inequality

Year	Within rural	Between rural
1997	16.7%	1.2%
1998	18.0%	1.9%
1999	17.3%	1.7%
2000	16.5%	1.8%
2001	13.7%	1.7%
2002	13.8%	1.5%
2003	14.8%	2.0%
2004	18.4%	1.9%
2005	13.6%	1.7%
2006	13.7%	1.7%
2007	12.8%	1.9%
2008	12.0%	1.8%
2009	12.5%	1.8%

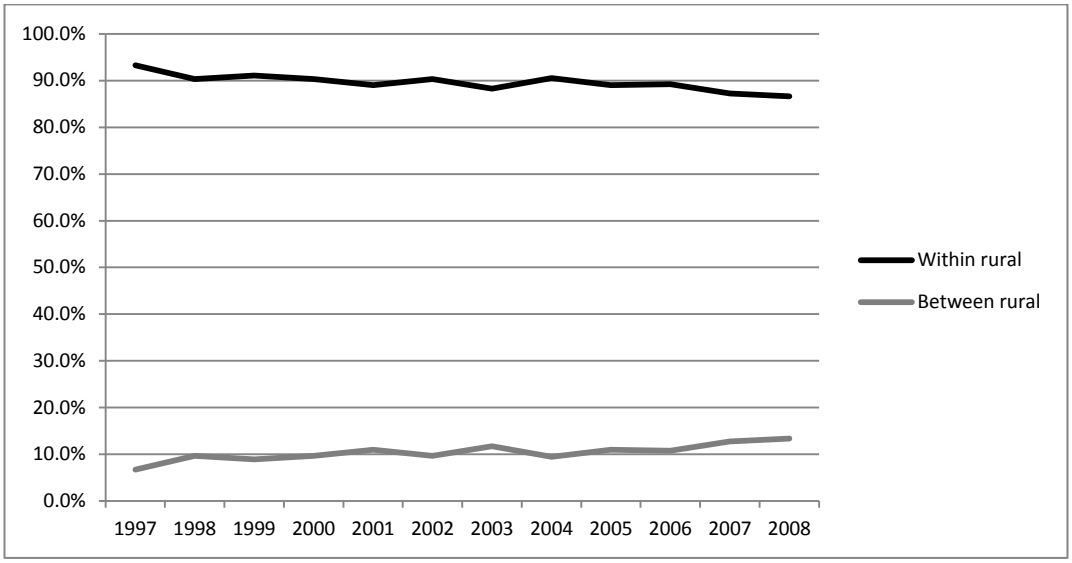
Figure 4.9.6 Contribution of within/between rural provincial inequality to overall inequality



Apart from a spike in the figures in 2004, in figure 4.9.6 one can clearly observe the shrinking contribution of rural inequality to overall inequality. It is this fall in the contribution of 'within' rural provincial inequality to overall inequality which explains the lessening contribution of the rural sector to inequality. The 'between' rural provincial inequality

component is actually constant, despite a shrinking rural sector in terms of income and population share. This pattern indicates an increase in inequality between the rural sectors of the provinces. This can be more clearly seen if we chart the contribution of within and between provincial rural inequality to rural inequality itself.

Figure 4.9.7 Contribution of within/between rural provincial inequality to rural inequality

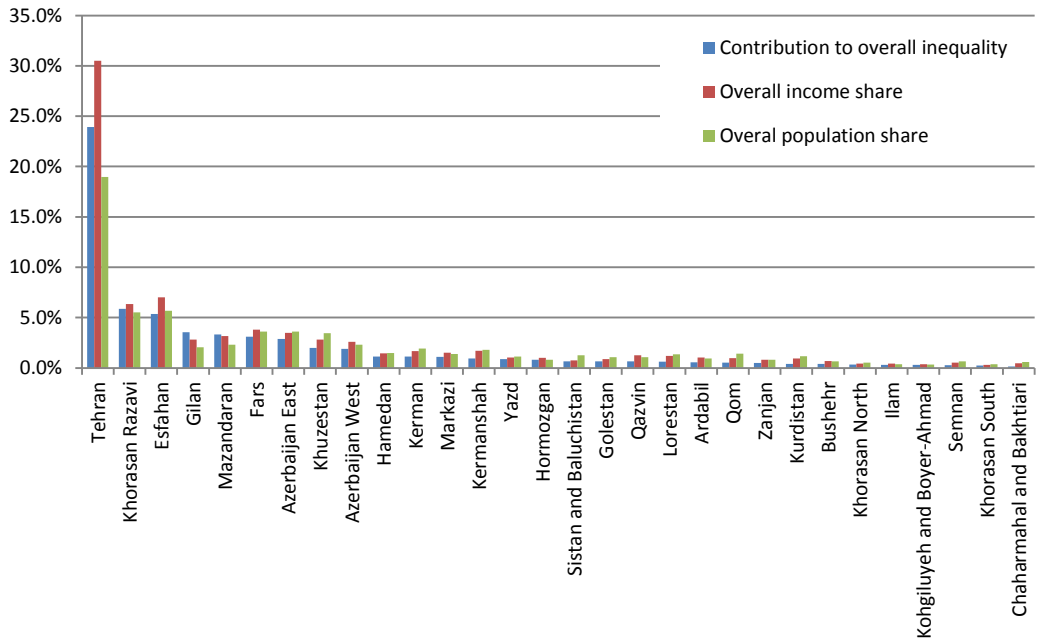


Clearly there is a widening inequality between the rural sectors of provinces relative to the inequality within them.

4.9.5 Urban provincial breakdown

The urban sector commands a major and increasing share of overall income. We have seen that the largest and growing component of inequality in Iran is the 'within inequality' component of urban provinces. A decomposition of this 'within inequality' on a provincial basis follows. We look at the year 2007. The table of results for this provincial breakdown is provided in appendix 4P.

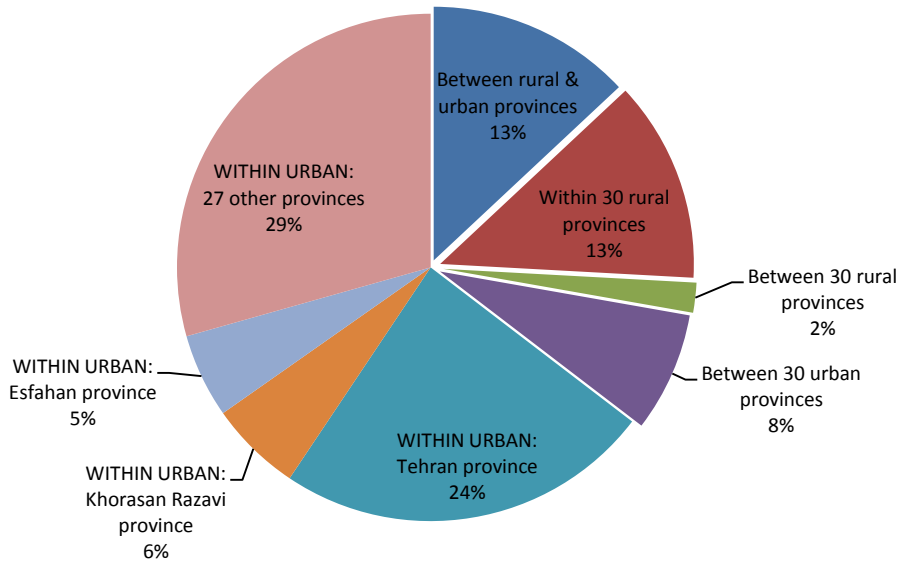
Figure 4.9.8 Contribution of provincial urban sectors to national inequality, 2007



It is striking that the urban areas within the Tehran province account for more than 30% of the national income share, despite a 19% population share. No other province displays such a proportional discrepancy between population and income shares. Dreger, Rahmani et al. (2007, p.10) demonstrate that the concentration of rent-seeking activities in Iran occurs in Tehran. These include "import licenses, subsidized loans, contracts to provide goods and services for government sector or implementing development projects, to obtain ownership of lands." In 2007, its contribution to overall inequality was 24%, almost a quarter of the total observed national inequality. The other two main contributors to inequality are the urban

areas of Khorasan Razavi province (dominated by the city of Mashhad) and the Esfahan province (dominated by the city of Esfahan). The urban sectors within these three provinces account for 35% of the total national inequality. The other 27 urban provinces account for 29% of the contribution to overall inequality.

Figure 4.9.9 Contribution to national inequality, 2007



The within urban inequality components dominate the observed national inequality, with Tehran alone accounting for almost a quarter of the observed inequality. A handful of cities now account for a major share of the observed inequality in Iran.

4.10 Conclusion

The findings in this chapter tell a story about both the small fluctuations and the underlying geographic sources of inequality in Iran since President Khatami's presidency in 1997. During this period, Iran's headline inequality figure has remained consistently high. This façade of consistency disguises several underlying major trends which emerge from the raw data.

Primarily, there is no direct relationship between growth or government spending and inequality. Upon decomposition however, it becomes evident that government expenditure has a bearing on the income share of the urban sector and this has a direct effect on the composition of inequality.

Combined with the finding that the fluctuations in income inequality have been dominated by the fortunes of the rich given their disproportionately large income share, this goes a long way in explaining why despite numerous rural development programs (Sharbatoghlie, 1991) and a drop in the poverty rate since the 1979 revolution (Tabibian, 2000, Salehi-Isfahani, 2008), the national income inequality figure still remains consistently high. The poor and the rural sector are found to account for a very small portion of the inequality figure. The urban sector has expanded to dominate the underlying inequality contribution from 60% in 1990 to 75% in 2010. Only 13% of overall inequality can be directly attributed to rural areas by 2010.[69]

Government policy needs to focus on new inequality alleviating measures within major urban centres, rather than rely on rural development programs, to bring about an improvement in national income distribution. It also needs to address the disproportionately large income share of the richest in society. Indeed, the lifting of general subsidies in late 2010 may have been the first sign of a policy shift in this direction.

In 2008, inequality fell due to the first real decrease in household expenditures, with the rich bearing the brunt of the expenditure loss. The small fluctuations witnessed in the

[69] An additional 12% of inequality contribution was due to the urban/rural divide in 2010.

headline inequality figures can be mostly apportioned to changes at the upper parts of the distribution and changes in the rural-urban divide. The rich have not sustained an increase in their expenditure relative to other groups during the past two decades and have actually lost income share since the fall in real expenditures in 2008. However, the continued dominance of the total income share by the rich means that poverty reduction measures will not have a significantly measureable effect on the headline inequality figure.

From a wider perspective, the results in general support our rentier theory predictions for income inequality with some caveats. While as predicted, inequality rate is not directly linked to the growth rate, it does fall in line with real expenditures after the 2008 global financial crisis. The fluctuations observed in the inequality figures are reflected in the fortunes of the rich rentier class. The urban/rural divide persists and government expenditure with an urban bias is evident. More revealing of all, despite successful poverty reduction, improvements in health and education, and numerous rural development programs, income inequality has remained consistently high. This post 1979 revolution period in Iran can serve as a model of how a rentier state's independent source of income (from oil revenues) can overwhelm domestic efforts at tackling income inequality measures.

5. Inter-provincial inequalities

5.1 Introduction

The results and discussions from the previous chapter provide insight into the structure and patterns of vertical economic inequality within Iran while treating all groups as the same. In this and the following chapter, the focus will be on deriving a number of horizontal inequality measures which are deemed significant in their own right and which are also built upon in the context of inequality within a rentier state.

In this chapter, we are tackling one of the main themes of the regional inequality discourse in Iran, that of inter-provincial inequality. We show that measuring inter-provincial inequality, by focusing on GDP/capita, for a rentier state such as Iran is misleading. We demonstrate the overly simplistic and erroneous notion of Iran's regional inequality as a rich central plateau surrounded by poorer periphery/border provinces. Convergence/divergence findings for provincial household expenditures for the 1997-2010 period are reported and analysed. The chapter comes to an end by questioning the link between growth and provincial convergence in a rentier state such as Iran.

Horizontal inequality is of particular interest in Iran due to two main characteristics of the Iranian economy and these two aspects in turn also determine the groups which this study will focus on. One characteristic is Iran's vastly varied geographic landscape and the wide variety of provinces and corresponding ethnicities.

The second is the economy's reliance on external oil revenues and the channelling of the revenues into the economy primarily via the public sector. These two factors will be the focus of measurement in chapter five and six. There are indeed many other horizontal inequalities which are worthy of research in Iran, such as gender, religion, marital status, civilian v military, nomad v housebound, self-employed v employed, but such research is beyond the scope of this study and the measures of relevance for this research are the ones which fall within our extension of the rentier theory framework as it relates to inequality.

Horizontal inequality between distinct cultural groups is cited as a potential contributing factor to conflict (Stewart, 2000a, Stewart, 2001, Stewart, 2005, Stewart, 2008, Østby, 2004). Muller and Seligson (1987) cite it as a cause of the 1979 Islamic revolution. Although the 'conflict consequences' of such horizontal inequality is disputed in the literature (Fearon and Laitin, 2003), its significance can be judged by the fact that an explicitly stated goal of the 1979 Iranian constitution and successive Iranian administrations has been to ensure inter-provincial equality[70].

Addressing growth and poverty are not the only stated economic objectives of Iran's government as demonstrated by President Mahmoud Ahmadinejad's numerous visits to Iran's provinces. There is a strong desire by the central government to be seen to be working towards increased provincial equality. This desire perhaps relates to the finding that when it comes to potential disharmony and conflict caused by horizontal inequality "relative position rather than absolute is more often observed to be the underlying determinant of conflict" (Stewart, 2000a, p.6).

As well as focusing on just two aspects of horizontal inequality, the economic inequality measure to be utilized is also confined to household expenditure inequality as this is available for all the years under study; it is consistent; it is intuitively understood; it is open to a wide range of statistical analysis, and in reflecting the final expenditure outcome of a household it is a powerful measure. There are many other economic indicators which can be used such as the UN 'Human Development Index'[71], provincial data relating to employment, transportation, education, health and GDP/capita. However all of these measures are either provided at the provincial level in aggregate format or are more an indication of economic development rather than a money metric measure of affluence.

[70] Article 48 of Iran's constitution specifically addresses regional equality. Current President, Mahmoud Ahamdinejad is famed for his numerous trips to Iran's provinces outside Tehran, to the *Shahrestans*.

[71] Published regional data for this measure is only available for one year and is in aggregate format. See UNDP-BPO 1999. Human Development Report of the Islamic Republic of Iran.

Macro indicators do not provide the rich pattern of data that household expenditure data can provide and they may also be skewed by locally based industries with weak linkages to the local population; in Iran's case the oil industry is a good example of such an industry. Our research is not concerned with macro measures of provincial economic activity, but rather with the micro-distribution of household expenditure levels across the provinces

5.3.1 The regional inequality debate in Iran

One type of inequality mentioned regularly in literature studies relating to Iran are regional inequalities (Amirahmadi,1986; Sharbatgholie, 1991). Despite the lack of published research on the exact extent and structure of regional income inequalities for the past decade, which this research partially seeks to address, there is no doubt that numerous publications point to an existence of high regional inequality in Iran both pre and post revolution. Pesaran (1976) points to high inter-regional and intra-regional inequality; Sharbatoghlie (1991) also reports high levels of regional disparities both before and after the revolution; Amirahmadi (1986, p.525) lists numerous pre-revolution studies indicative of high regional inequality[72].

[72] **AMIRAHMADI, H. 1986. Regional Planning in Iran: A Survey of Problems and Policies *The Journal of Developing Areas,* 20, 501-530.**"Hooshang Amirahmadi and Farhad Atash, "Regional Disparity in Iran" (Paper presented at the 18th Annual Meeting of the Middle East Studies Association of North America, San Francisco, 28 November-I December 1984); Akbar Aghajanian, "Ethnic Inequality in Iran: An Overview," International Journal of Middle East Studies 15 (May 1983): 211-24; Mohammad Hemmasi, "The Identification of Functional Regions Based on Lifetime Migration Data: A Case Study of Iran," Economic Geography 56 (July 1980): 223-33; Hamid Kiannejad, "Policies of Spatial Discrimination in Promoting Development in Iran," in Growth Pole Strategy and Regional Development Planning in Asia,
526 Hooshang Amirahmadi Conference Proceedings (Nogoya, Japan: United Nations Center for Regional Develop-ment, 1975), pp. 157-63; Robert Looney, The Economic Development of Iran (New York: Praeger, 1973); Farhad Nourbakhsh, Classification of the Iranian Provinces and a Model for the Determination of Priorities to Reduce Regional Differences fin Persian] (Tehran: Plan and Budget Organization, Mordad 2536 [1977]); Ehsan Naraghi, "Regional Studies in Iran," in Multidisciplinary Aspects of Regional Development (Paris: Montpelier, De-velopment Center for the Organization for Economic Cooperation and Development, 1968), p. 239; Harry W. Richardson, "Regional Planning in Iran," Growth and Change: A Journal of Regional Development 6 July 1975): 15-19; R. Olivier, "Regional Problems and Decentralization," Employment and Income Policies for Iran, Mission Working Paper no. 11 (Geneva: International Labor Organization ILO], February 1973); George E. Wright, Jr., "Regional Inequality in the Economic Development of Iran, 1962-1970" (Ph.D. diss.,

Post revolution references to regional inequality include Farmanesh (2009) with a focus on new economic geography, Noorbakhsh (2003) on human development indices, Tabibian (2000) and UNDP (2003) on income inequality and poverty, Karbasi and Mojarad (2008) on public investment, Lotfi, Faraji et al. (2011) on peripheral analysis and Assadzadeh and Paul (2004) on incidents of regional poverty. Although, given the diverse objectives of the aforementioned studies, there is inevitability a lack of consistency among the studies between 'what' is measured and 'how' it is measured. Nevertheless this block of literature leads to a consensus that a high level of regional inequality existed pre-revolution and is still persistent.

When it comes to the determinants of regional inequality the literature is understandably more divided and significantly the conversation has not changed since the pre-revolution period. This indicates that not only have regional inequalities in Iran persisted but a consensus as to their resolution has not yet emerged. Although it is not the purpose of this chapter to investigate the possible determinants and solutions to regional inequality in Iran, but rather to investigate its extent and recent evolution, it is deemed essential to assess how the issues at the heart of this debate fit into our empirical findings and the rentier theory framework more generally.

Three main themes emerge from the regional inequality literature on Iran:

1. Inter-provincial inequality (analysed in this chapter)
2. Ethnic inequality (analysed in chapter six)
3. The rural-urban divide (analysed in chapter six)

University of Michigan, 1977); Nima Nattagh, "Consideration of Some Aspects of Regional Development in Iran in the Third, Fourth, and Fifth Plan Periods (1962-1978)" (Ph.D. diss., University of London, October 1984); Battelle Institute, Battelle Regional Development Project-Unified Report (Tehran: Plan and Budget Organization, 1972); See iran, National Spatial Strategy Plan (Tehran: Plan and Budget Organization, 1976); and Ital Consult, Report on the Southeastern Iran (Tehran: Plan and Budget Organization, 1957)."

5.3.2 Centralized or regional planning

The determinants put forward, rightly or wrongly, in the discourse on regional inequality in Iran are commonplace in the general regional inequality literature. Natural resource endowment arguments (Piran, 2000, p.60, Sharbatoghlie, 1991, p.37-44), distance from market and lack of transportation infrastructure (Farmanesh, 2009, Lotfi et al., 2011), ethnic bias (Torof, 2004), conflict: Iran-Iraq war (Sharbatoghlie, 1991), and centralization bias (Aghajanian, 1983, Amirahmadi, 1986). The plethora of suggested determinants is too varied and large in number to be addressed by this research. However, by focusing on the policy recommendations, this study can relate to the discourse more meaningfully.

We have divided policy recommendations for regional inequality between two camps; those prescribing a differing level or mix of sectoral regional investment by the central administration, and those who are not so much concerned with specific sectoral policies per se, but conclude that a change is required in the policy making process itself; advocating a move from centralized to regional planning. In short the first group focus on ‘regional development’ policies within the national development plan whereas the second group advocate ‘regional planning’.

Table 5.3.1 The two main schools of thought on tackling regional inequality in Iran

Change in policy making process (Regional planning)	(Amirahmadi, 1986)	Sectoral institutions and a drive for centralism overpowering regional ones. Switch to regional planning.
	(Aghajanian, 1983)	Blames urban bias and centralized government
	(Sharbatoghlie, 1991)	Move to decentralization
Change in sectoral investment (Regional development)	(Karbasi and Mojarad, 2008)	Change in central investment strategy
	(Farmanesh, 2009)	Increase in transportation investment, decrease effective distance, decrease need for migration (new geography theory)
	(Lotfi et al., 2011)	Central government should reduce inequality between peripheral and central regions

Perhaps the most adamant proponent of regional planning has been Amirahmadi (1986). In short, he contends that despite numerous and well intentioned policy measures both pre and post revolution to tackle regional disparities, the centralized, sectoral and capital oriented thrust of the Iranian economy has overwhelmed the impact of regional specific policies.

"Iranian planning documents hardly ever mentioned 'regional planning'; their preferred terminology was 'regional development,' which primarily meant utilization of regional resources for national growth." (Amirahmadi, 1986, p.512).

In Iran sectoral institutions consistently win over regional ones, despite organizational restructuring since the Islamic revolution. This can be seen by chapter six of Iran's 3rd five year economic plan (2000-2005), which despite citing job creation provisions for deprived regions, again prioritized and benefited major urban areas in practice (Lotfi et al., 2011). This line of reasoning sits comfortably with rentier theory which predicts that as long the central government is the main disburser of revenue coming from an outside source, public expenditure and investment would inevitably become concentrated around a select number of urban regions (First, 1980).

Despite the call for regional planning by researchers such as Amirahmadi (1986), this would inevitably require or lead to a degree of regional autonomy and that is not in keeping with Iran's political centralization drive over the past 80 years and looks unlikely to be reversed in the near future. There is also no consensus on the benefits of increased planning autonomy for initially severely disadvantaged regions in an oil economy with a weak progressive fiscal system. "In the absence of redistributive fiscal transfers, recent reforms in many countries toward greater decentralization may aggravate regional disparities" (Ferreira and Walton, 2005, p.204).

This is perhaps why many post-revolutionary Iran researchers contribute within the regional development framework rather than advocate regional planning as a solution[73]. Inherent in most discussions of such research are explicit or implicit references to the

[73] There are also recent new economic geography studies (Farmanesh 2009) which test for convergence and polarization to explain the degree of witnessed labour migration and growth of urban centers. Despite subsidies and tax breaks to encourage investment in more deprived regions, Farmanesh (2009) finds the lack of input resources and distance from market a barrier for most firms to invest beyond affluent urban centers. However, please note that new geography explanations are not concerned with explaining the 'initial advantage' gained by certain regions over others.

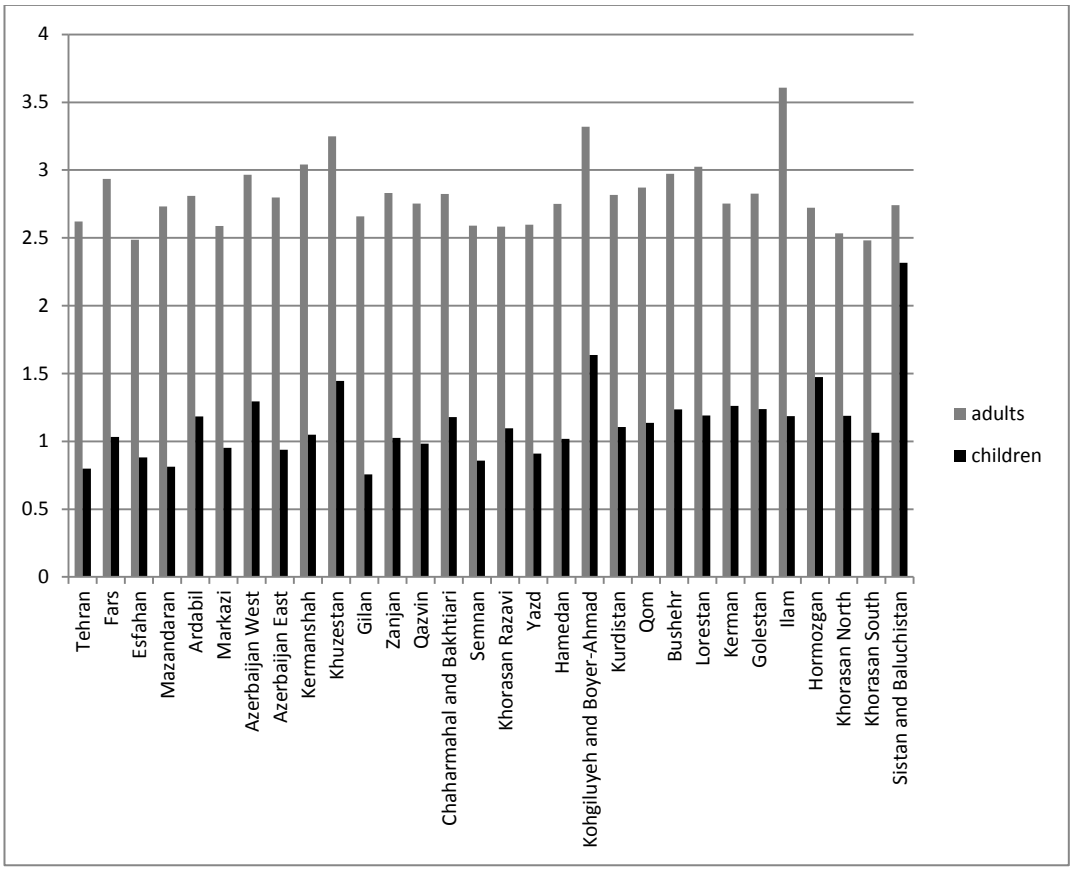
affluent central plateau and the poorer peripheral provinces. The idea of central prosperity and peripheral isolation is rooted in economic geographic literature (Getis and Getis, 1966). In Iran's case the 'centre with the initial advantage' is deemed to be Tehran and the central plateau region. Sharbatoghlie (1991) cites centralization as one of the major factors for the booming of Tehran, "Centralization of public investments, either directly…or indirectly through the diffusion of oil income…had important implications on the expansion of Tehran" (Sharbatoghlie, 1991, p.158). Indeed the inequality between Iran's provinces has been characterized as a divide essentially between the central urban provinces and the rural dominated border provinces[74] (Lotfi et al., 2011). Despite this contention, there is a lack of research on assessing whether this centre/periphery inequality exists at the household level, which we will address later in this chapter.

[74] Roughly half of the Iranian provinces are border provinces.

5.4 Inter-provincial inequality findings

In presenting inter-provincial measures, we can either use the equivalence expenditure data or an aggregate of household expenditure not scaled for household size. Although non-scaled data would be more suitable for reporting absolute values, given that our concern is primarily with making comparisons between provinces, we have opted for scaled expenditures. This is because the mean number of adults and children varied significantly from province to province (see Figure 5.1.1) and hence it was deemed necessary to account for this using an equivalence scale. For example note the high number of children in Sistan and Baluchistan province or the high number of adults in Ilam province.

Figure 5.4.1 Mean number of adults and children in Iran's provinces, 2010



Therefore our reported mean expenditures should not be used for reporting absolute provincial means, and are only pertinent in making comparisons with other provinces. Mean provincial expenditures using non-scaled household data, suitable for reporting absolute values, are presented in appendix 5D for the year 2010.

Apart from presenting findings on provincial mean household expenditures, there are a number of empirical questions which will be addressed specifically in this section.

1. What picture of divergence/convergence emerges from this dataset?
2. Is there a separate pattern of divergence/convergence vis-a-vis rural and urban areas?
3. Is there any evidence of polarization between the richest and poorest province?
4. Does the geographic picture of rich central provinces v poor periphery provinces emerge?
5. How do these figures compare with Iran's provincial GDP/capita figures, which are used to report inter-provincial inequality and more recently to carry out divergence/convergence analysis (Araghi and Rahmani, 2011)?
6. How predominant is Tehran as a province? Tehran is often cited as a primate province in rentier theory literature (Dreger et al., 2007, Bjorvatn and Selvik, 2008).
7. Are there any patterns distinguishing the poorest provinces from the richest ones?
8. Are provinces' household well being matched by available inter-provincial migration data?

Our findings are based on equivalence household expenditures, accounting for household size, treating children and adults differently and also using different equivalence ratios for urban and rural households. The calculated log mean household expenditure for each province 1997-2010 is presented in Appendix 5A, 5B and 5C. These are broken down into a combined weighted mean of both the rural and urban areas of the province, an urban

mean and a rural mean. In the table 5.4.1 we take a close look at the latest year of the dataset, 2010.

Table 5.4.1 shows the mean household expenditure for each province, the weighted overall mean (rural and urban combined) and the urban and rural mean consecutively. We have also included the household population share of each province to indicate the significance of each of the 30 provinces[75] in the overall results. The mean expenditures vary considerably; by over a factor of three between the richest (Tehran) and poorest (Sistan & Baluchistan) province. In the following sections we take a closer look at the figures and investigate the aspects which relate to our study. We first look at how they differ from GDP/capita figures, often used in regional inequality analysis, as this has implications for other rentier countries.

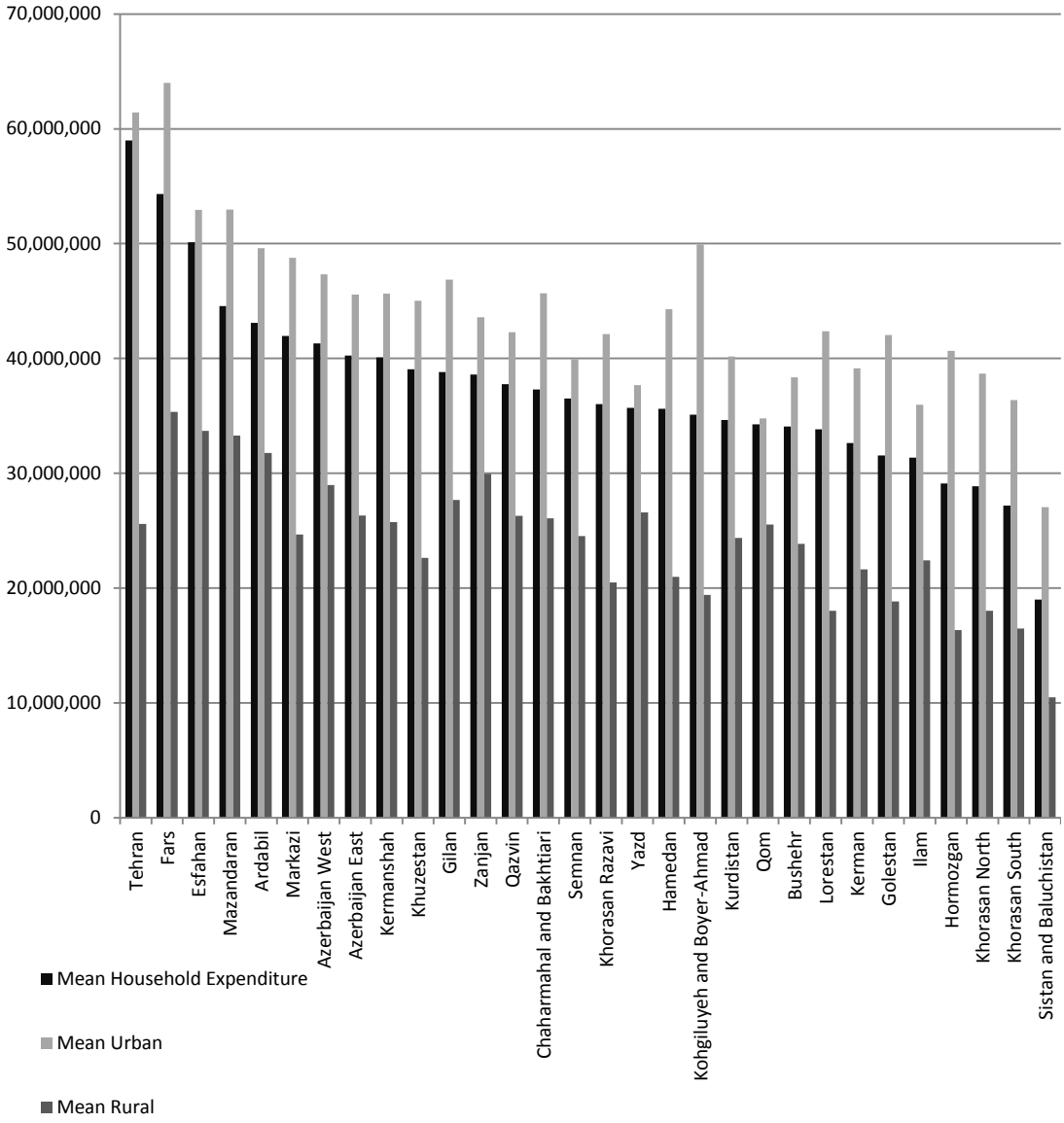
[75] Please note that from mid-2010 (after the period under study) the province of Alborz was added to Iran's list of provinces, making up a total of 31 provinces. Alborz province was previously a part of Tehran province.

Table 5.4.1 Mean household expenditure by province, 2010

Sorted by 'Mean Total', Riyals equivalence scale

Province	Pop share	Mean Total	Mean Urban	Mean Rural
Sistan and Baluchistan	2.61%	18,994,661	27,059,889	10,480,434
Khorasan South	0.89%	27,195,973	36,376,087	16,477,825
Khorasan North	1.11%	28,856,641	38,671,117	18,025,733
Hormozgan	1.69%	29,119,862	40,661,497	16,345,871
Ilam	0.63%	31,371,141	35,971,755	22,399,710
Golestan	2.12%	31,559,451	42,030,950	18,817,899
Kerman	3.46%	32,626,668	39,148,015	21,612,593
Lorestan	2.17%	33,829,847	42,375,600	18,019,856
Bushehr	1.08%	34,075,285	38,356,405	23,839,215
Qom	1.54%	34,266,149	34,763,911	25,541,192
Kurdistan	1.91%	34,636,997	40,170,911	24,359,352
Kohgiluyeh	0.70%	35,086,200	49,926,018	19,391,567
Hamedan	2.42%	35,617,028	44,291,228	20,965,093
Yazd	1.50%	35,688,559	37,678,276	26,597,252
Khorasan Razavi	8.15%	36,020,265	42,117,758	20,486,046
Semnan	0.92%	36,512,085	39,929,381	24,525,713
Chaharmahal and Bakhtiari	1.09%	37,296,030	45,682,941	26,065,929
Qazvin	1.68%	37,752,514	42,285,518	26,291,088
Zanjan	1.33%	38,605,931	43,581,519	29,935,804
Gilan	3.76%	38,812,642	46,854,347	27,663,460
Khuzestan	4.94%	39,060,861	45,026,486	22,622,940
Kermanshah	2.54%	40,090,785	45,638,496	25,751,641
Azerbaijan East	5.21%	40,239,854	45,569,204	26,316,779
Azerbaijan West	3.72%	41,319,132	47,332,047	28,983,897
Markazi	2.08%	41,954,010	48,759,902	24,662,880
Ardabil	1.59%	43,099,255	49,592,699	31,752,333
Mazandaran	4.39%	44,563,539	52,972,687	33,290,902
Esfahan	7.12%	50,129,741	52,937,638	33,684,816
Fars	5.76%	54,332,375	63,994,327	35,352,269
Tehran	21.91%	58,983,521	61,438,201	25,593,477

Figure 5.4.2 Mean Household Expenditure by Province 2010, sorted by 'Mean Total'



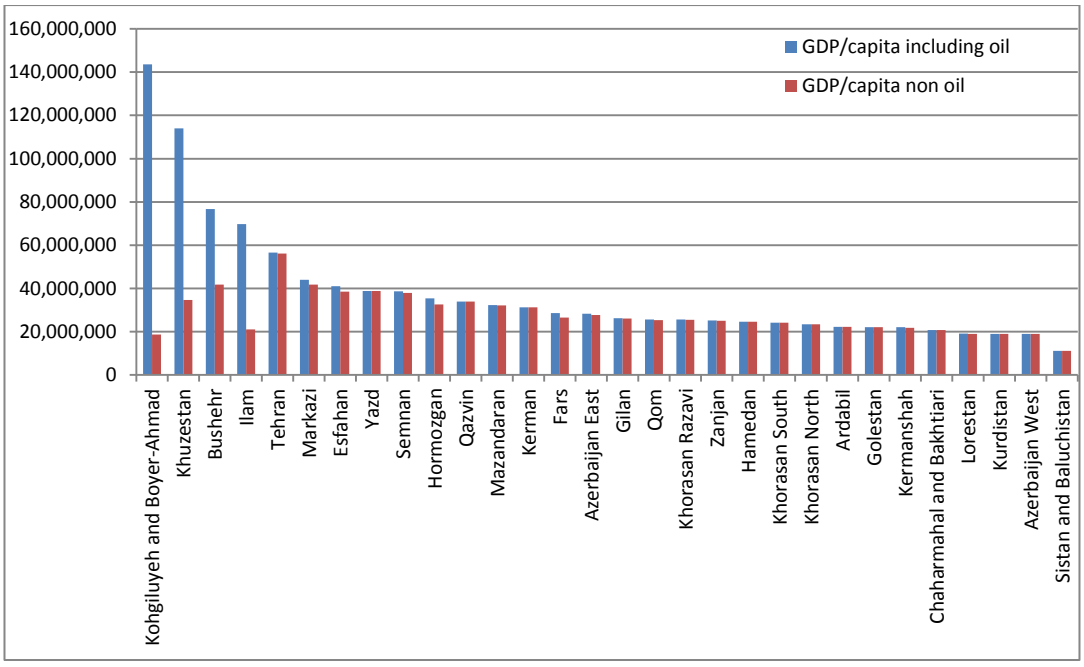
5.4.1 Comparison to provincial GDP/capita figures

The benefits of using micro data as opposed to aggregated GDP data in assessing inter-provincial income inequality are manifold (Azzoni, 2001). Although household survey data will not be used here to construct demographic cohorts or focus on determinants, even for simple mean comparisons and convergence/divergence analysis household data can be more revealing of the 'real economic experience' of households across the provinces rather than aggregated GDP data. It also allows for horizontal inequality comparisons along

particular segments of the income distribution axis rather than just the mean, as can be seen in the urban-rural analysis in the next chapter. Household data is also imperative for measuring inequalities within provinces and conducting non-geographic group inequality comparisons.

Assessing provincial income inequality or conducting provincial convergence/divergence research using GDP figures (Araghi and Rahmani, 2011, Farmanesh, 2009) can be especially problematic in Iran's case, given the large contribution of oil to the GDP. Numerous provinces have some degree of oil, gas or other mining output, and for certain provinces such as Khuzestan, Bushehr, Ilam and Kohgiluyeh Boyer-Ahmad natural resource output, with few linkages with the domestic economy, dominates their GDP. Below is a figure of GDP/capita for Iran's provinces (2007) with and without the inclusion of oil output in the GDP. A table of the data is provided in appendix 5E.

Figure 5.4.3 Provincial GDP per capita with and without oil, 2007



Data source: (SCI, 2009)

But even the use of non-oil GDP per capita can be misguided when assessing inequality. Certain provinces may be home to a disproportionate number of isolated ‘industrial complexes’ or other high output activities with little linkages to the domestic economy. There is also always a very small proportion of the oil which does filter through to the local economy. By using household data, the final expenditure of households is being compared across provinces, allowing for a comparison based on economic resources which have accrued to the households.

Table 5.4.2 presents a provincial ranking based on GDP (with and without oil) and scaled household expenditure.

Table 5.4.2 Provincial ranking 2007 (1 is highest)

Provinces	Ranking GDP/capita oil	Ranking GDP/capita non oil	Ranking household expenditure
Kohgiluyeh and Boyer-Ahmad	1	29	19
Khuzestan	2	7	23
Bushehr	3	3	11
Ilam	4	24	13
Tehran	5	1	1
Markazi	6	2	12
Esfahan	7	5	2
Yazd	8	4	14
Semnan	9	6	20
Hormozgan	10	9	9
Qazvin	11	8	4
Mazandaran	12	10	3
Kerman	13	11	22
Fars	14	13	10
Azerbaijan East	15	12	15
Gilan	16	14	5
Qom	17	16	24
Khorasan Razavi	18	15	7
Zanjan	19	17	17
Hamedan	20	18	18
Khorasan South	21	19	29
Khorasan North	22	20	28
Ardabil	23	21	8
Golestan	24	22	27
Kermanshah	25	23	16
Chaharmahal and Bakhtiari	26	25	26
Lorestan	27	28	21
Kurdistan	28	26	25
Azerbaijan West	29	27	6
Sistan and Baluchistan	30	30	30

It is noteworthy how the rankings of the household expenditure and non-oil GDP/capita differ. Oil rich Khuzestan province is ranked 7th highest (out of 30 provinces) even when looking at non-oil GDP/capita, but only ranks 23rd if using household expenditure data. Conversely,

Khorasan Razavi (home to Iran's second largest city Mashhad), ranks only 15th in terms of non-oil GDP/capita but rises to 7th if looking at household expenditures. It is clear that even non-oil GDP/capita cannot be a suitable proxy for considering inter-provincial income inequality at the household level.

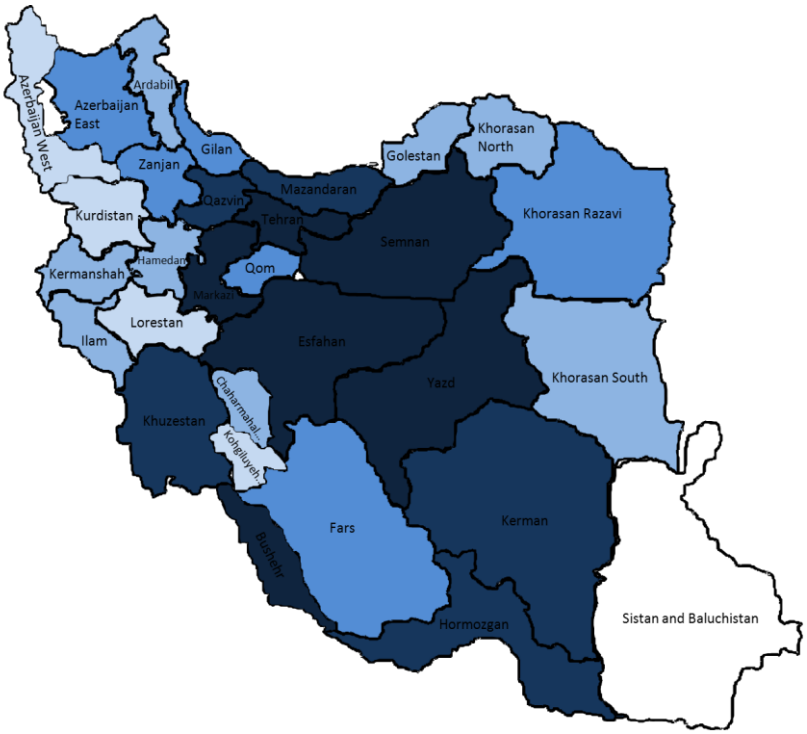
It follows that using convergence/divergence analysis with a view to assessing inter-provincial income convergence for households is problematic if using GDP figures. This problem is further aggravated if the oil component is not removed from the provincial GDP.

5.4.2 Centre v periphery

In this section we investigate whether Iran's regional inequality characterization of central versus periphery (Lotfi et al., 2011) is a valid one. We find this characterization to be unwarranted. Such a misleadingly simple perspective on Iran's regional inequality disguises a much more complex picture and may result in misguided regional development policies.

If we take the classic approach of using GDP/capita data to assess regional inequalities, and map the inequalities for 2010 (see figure 5.4.4), then to a large degree the picture which emerges is indeed of a rich centre vs a poorer periphery. But as we have already noted GDP/capita figures, even non-oil based measurements, do not provide a fair reflection of household incomes, especially in a rentier state.

Figure 5.4.4 Provincial non-oil GDP/capita, 2010

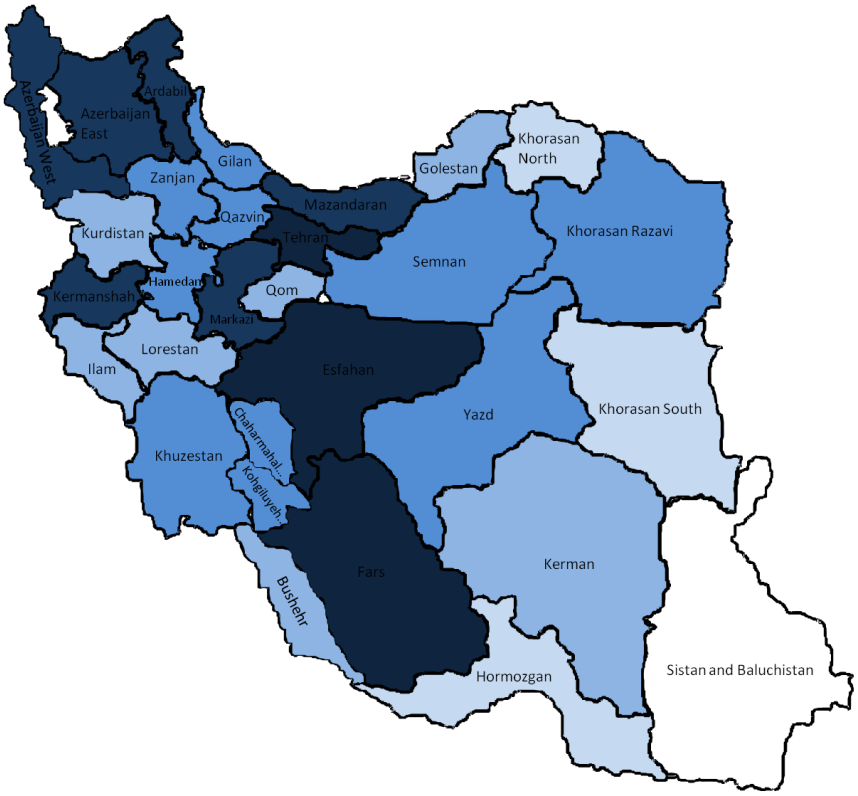


Index for non-oil GDP/capita (Riyals)

	0-15,000,000
	15,000,000-20,000,000
	20,000,000-25,000,000
	25,000,000-30,000,000
	30,000,000-35,000,000
	35,000,000+

But if prepare a thematic map based on household expenditures the picture is quite different. Figure 5.4.5 shows provincial weighted mean expenditures (weighted total of urban and rural) for 2010.

Figure 5.4.5 Provincial household mean expenditures, 2010



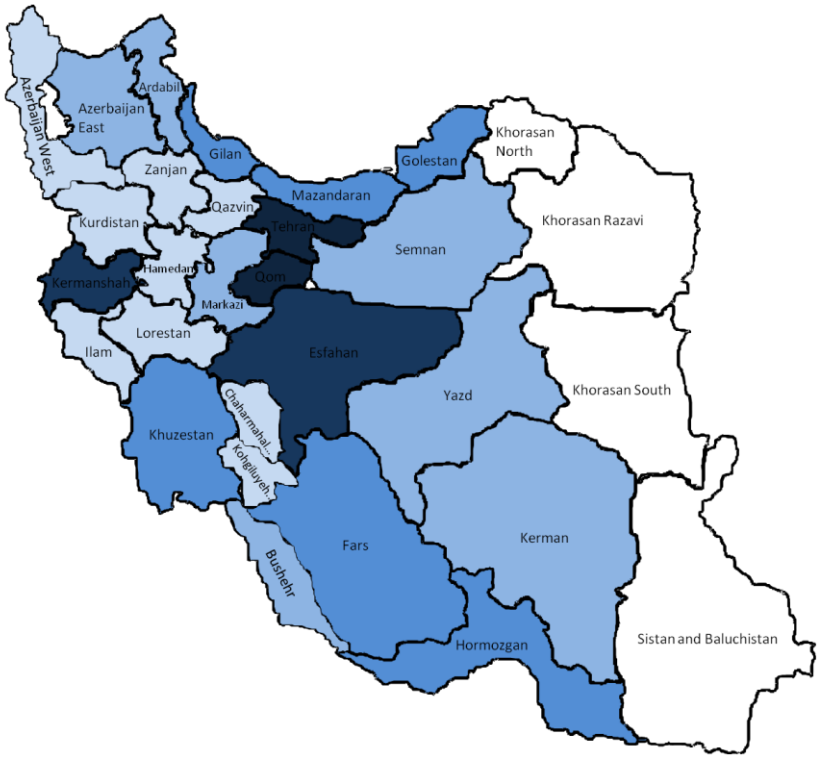
Index for mean household expenditures (Riyals)

	0-25,000,000
	25,000,000-30,000,000
	30,000,000-35,000,000
	35,000,000-40,000,000
	40,000,000-45,000,000
	45,000,000+

Figure 5.4.5 does not seem to be a simple one of central provinces having higher income households than the periphery provinces. Qom province, for example, which is sandwiched between the rich states of Tehran and Esfahan, with good transport links to both, has relatively low household expenditure levels; whereas the border provinces of Azerbaijan

(East and West), Ardabil, Kermanshah and Mazandaran all exhibit above average mean household expenditures. This is not to say that previous analysis has been incorrect. The difference in the results is partly due to the unduly focus on GDP/capita, but also due to the changes in inter-provincial divisions during the past 20 years. To test for this, Figure 5.4.6 displays a thematic map of provincial mean household expenditure for 1990. The data has been prepared in the same way as the 1997-2010 dataset.[76]

Figure 5.4.6 Provincial household mean expenditures 1990 (weighted overall mean)



Index for mean household expenditures (Riyals)

	0-450,000
	450,000-550,000
	550,000-650,000
	650,000-750,000
	750,000-850,000
	850,000+

[76] Equivalence expenditures to account for household sizes, adults and children, and different scales for rural and urban areas. The provincial sampling (stratification) weights however were estimated using national census data of 1986, unlike the 1997-2010 dataset for which the exact weights were available from the Statistical Centre of Iran.

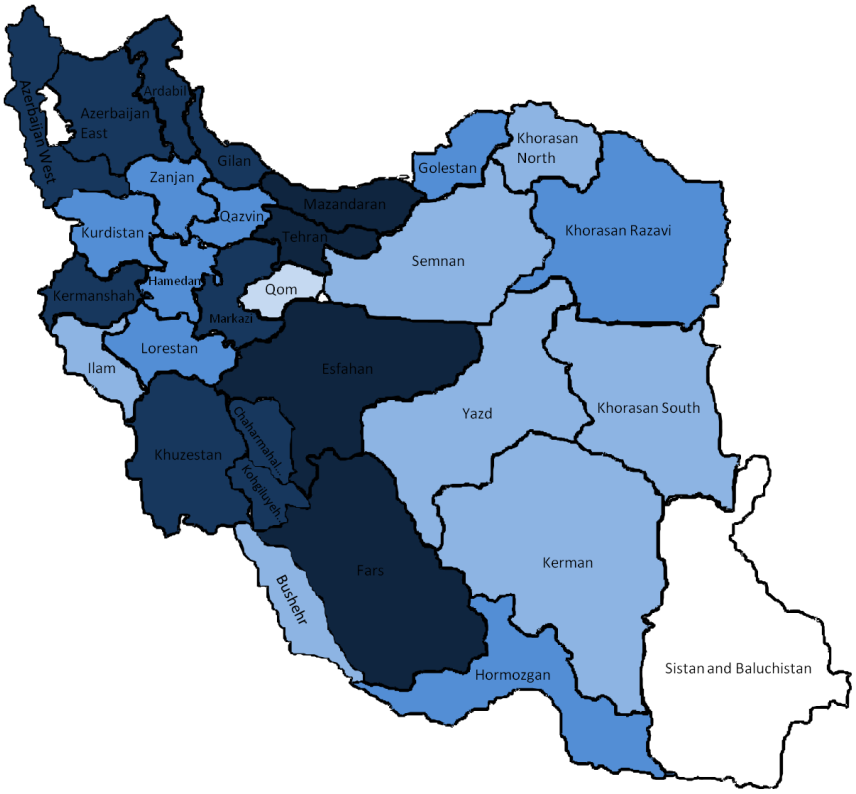
It is immediately evident that the geographic picture of rich centre provinces v poorer periphery provinces is more apparent in 1990. This comparison makes it clear that one of the primary reasons for this difference between 1990 and 2010 is a change in provincial subdivisions. In 1990 Iran had 24 provinces and inter-provincial calculations were carried out on this basis.[77]

For instance all the north eastern 'Khorasan' provinces were simply treated as one province in 1990, leading to an overall low household mean. Whereas if the Khorasan districts, were to be accounted for separately (as is the case in the 2010 thematic map), the two provinces of Khorasan North and South would display much lower expenditure levels than the much richer Khorasan Razavi. Similarly in 1990, Qom province was a part of Tehran province, so the high mean expenditure level of Tehran province was also being reflected geographically for the Qom area. In the 2010 thematic map, when this is no longer the case and Qom is represented by its own province, it is geographically characterized by a low mean household expenditure. Another example is the separation of Golestan province from Mazandaran province. In 1990, when both areas were part of the administrative Mazandaran province, the province's mean household expenditure is in the medium range. But in 2010, we notice a much poorer Golestan province and a very rich Mazandaran province.

In short, the amalgamation of vast areas under one administrative province in the past was obscuring major differences in household expenditures between adjacent areas, leading to a thematic picture open to misinterpretation. The central v periphery division is further negated, if thematic maps of mean household income are drawn up separately for urban and rural areas in 2010. See Figures 5.4.7 and 5.4.8.

[77] Although in our thematic map (Figure 5.4.6) all 30 provinces are geographically presented along the same borderlines as 2010 for comparative reasons.

Figure 5.4.7 Provincial urban household mean expenditures, 2010

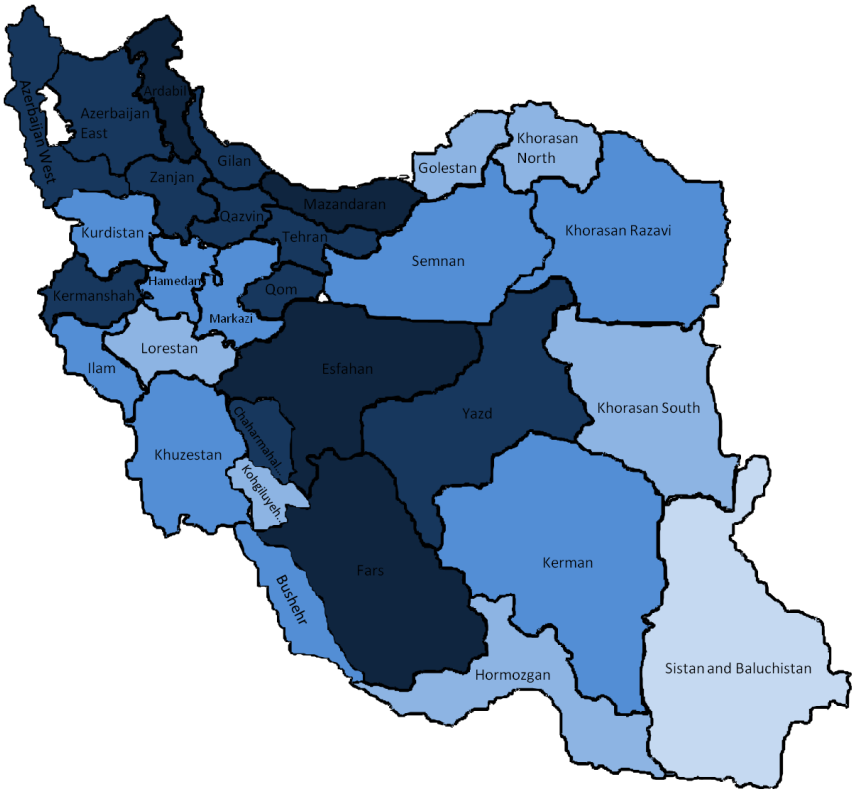


Index (Riyals)

	0-30,000,000
	30,000,000-35,000,000
	35,000,000-40,000,000
	40,000,000-45,000,000
	45,000,000-50,000,000
	50,000,000+

As well as the central provinces, the urban thematic map indicates relatively high urban household incomes for the border provinces of the North West and South West. Qom province, which is centrally located, has a very low urban household expenditure mean.

Figure 5.4.8 Provincial rural household mean expenditures, 2010



Index (Riyals)

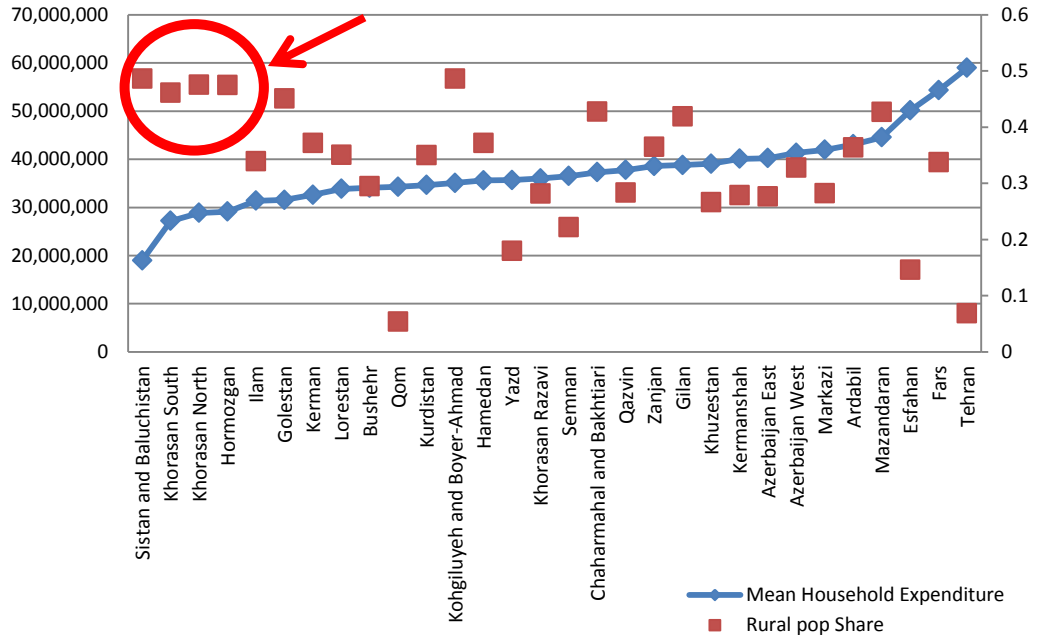
	0-10,000,000
	10,000,000-15,000,000
	15,000,000-20,000,000
	20,000,000-25,000,000
	25,000,000-30,000,000
	30,000,000+

The rural thematic map, points to richer rural areas in the north western and central provinces. Qom's rural sector also has a relatively high expenditure level compared to its relatively low urban expenditure level. In fact Qom has the lowest urban to rural discrepancy of any province.

5.4.3 Rural population

Although not conclusive, the poorest provinces in our findings tend to have a higher rural population share or relatively lower urban populations. As we move from left to right along figure 5.4.9, i.e. from lower to higher household expenditures, the square dots representing the rural population share tend to move from the top to the bottom. Of the lowest thirteen provinces in terms of household expenditure, twelve of them have rural populations above 30%[78]. Provincial urban and rural population/expenditure shares are provided in appendix 5F.

Figure 5.4.9 Poorest provinces dominated by a high rural population



[78] Qom province is the odd one out with a rural population share of 5%.

5.5 Convergence/divergence of provinces over time

Apart from looking at a snapshot of inter-provincial inequality in Iran, it is also of interest to find out how it has evolved over the period under study 1997-2010. To do this, the dataset is tested for Sigma convergence and Esteban and Ray (1994) polarization. A brief comparison with GDP growth is also made, with results being conflicting on the effect of growth on the observed convergence/divergence.

At least two broad concepts of convergence exist in the literature, beta and sigma convergence. Beta(β) convergence analysis is often grounded in economic growth theory, testing whether "poor countries or regions tend to grow faster than rich ones" (Barro and Sala-i-Martin, 1992, p. 223). Neo-classic theory holds that this should be the case as homogenous regions converge towards a steady state of capital at a falling growth rate. This is due to the mechanism of diminishing returns to capital, with regions furthest from their steady state, growing the fastest. Beta convergence captures the speed with which logarithm per-capital output tends to its steady state. Absolute or unconditional β convergence suggests that all regions are converging to an identical and common steady state, whereas conditional convergence refers to each region converging to its own steady state.

Sigma convergence is essentially a dispersion measure and explores whether regions are dispersing or converging towards a variance of output over time (Lee, Pesaran and Smith 1997).

As it becomes evident later in this section, the household expenditure rankings of many of Iran's provinces alter from year to year and therefore rather than opting for a regression based Beta(β) convergence methodology[79], sigma (σ) convergence analysis is being used at the household expenditure level to assess whether provinces are converging towards or diverging away from a common household expenditure level; in effect testing

[79] Beta(β) convergence is a necessary but not a sufficient condition for sigma (σ) convergence SALA-I-MARTIN, X. X. 1996. Regional cohesion: evidence and theories of regional growth and convergence. *European Economic Review,* 40**,** 1325-1352.

whether the dispersion of provincial mean household expenditures reduces or increases over the period under study. Exogenous factors are, by definition, also a dominant factor in growth in rentier states, and using an endogenous growth model to explain convergence may not be appropriate (Charles Ka-Yui and Danny T, 1996).

The dispersion measure used in this study is the standard deviation of the log mean of each province, giving rise to the sigma (σ) value. The condition for sigma (σ) convergence between the two periods of t and t + 1 is:

$\sigma_{t+1} < \sigma_t$

where

$$\sigma_t^2 = \frac{1}{n}\sum_{i=1}^{n}\left[ln\left(E_{i,t}\right) - \mu\right]^2$$

and

$$\mu = \frac{1}{n}\sum_{=1}^{n} ln\left(E_{i,}\right)$$

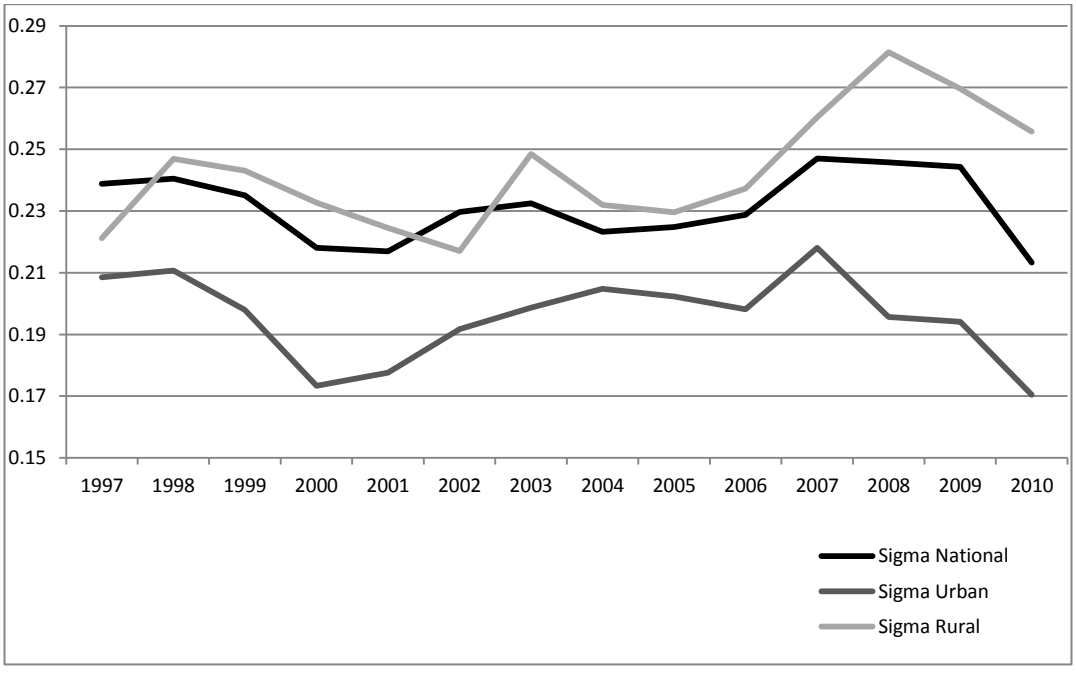
E is the mean household expenditure in time t for each province i.

The sigma (σ) value was calculated for the urban, rural and weighted mean of both regions for each province. Rather than just taking a snapshot of two years and comparing the sigma values, the measure was calculated for all the years under study, 1997-2010. This large dataset provides a more revealing pattern for the whole period and guards against a simple convergence or divergence conclusion; in case of significant fluctuations being present, which indeed proved to be the case. The results are presented in table and figure 5.5.1.

Table 5.5.1 Provincial convergence/divergence, 1997-2010

	Sigma National	Sigma Urban	Sigma Rural
1997	0.24	0.21	0.22
1998	0.24	0.21	0.25
1999	0.24	0.20	0.24
2000	0.22	0.17	0.23
2001	0.22	0.18	0.22
2002	0.23	0.19	0.22
2003	0.23	0.20	0.25
2004	0.22	0.20	0.23
2005	0.22	0.20	0.23
2006	0.23	0.20	0.24
2007	0.25	0.22	0.26
2008	0.25	0.20	0.28
2009	0.24	0.19	0.27
2010	0.21	0.17	0.26

Figure 5.5.1 Provincial convergence/divergence, yearly trends 1997-2010

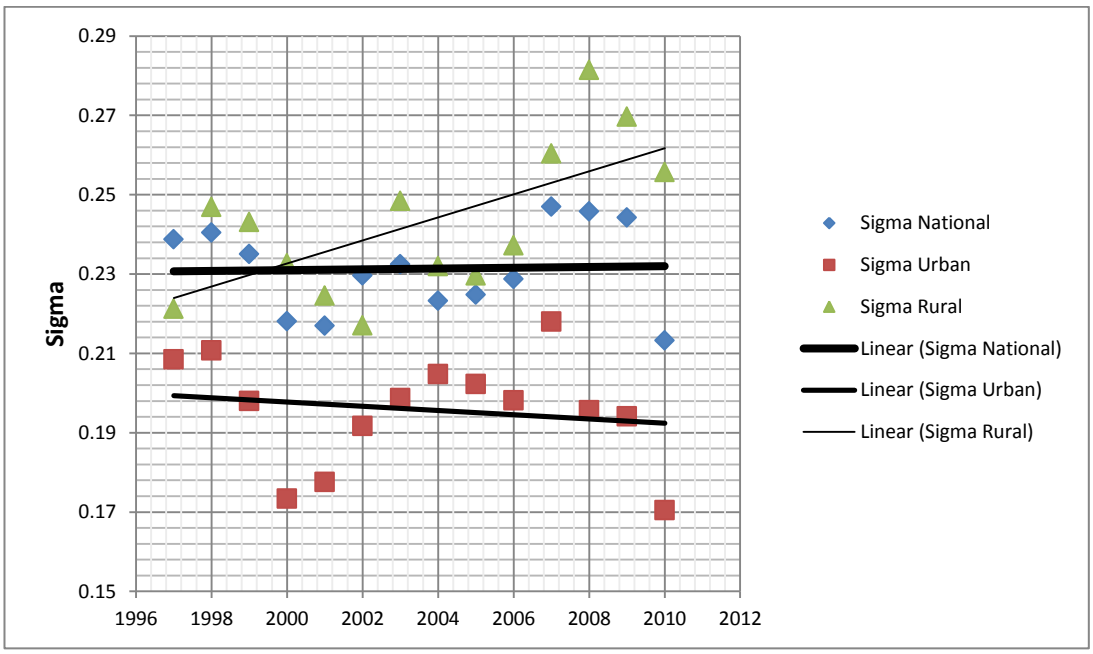


As can be observed from figure 5.5.1, there is clear evidence of both convergence and divergence during this period. The sigma values are also higher for the rural than the urban areas, suggesting greater rural inter-provincial inequality. This could be related to the larger

part played by the public sector in urban areas than rural areas, a topic discussed in the next chapter.

At first glance, looking at the national sigma values, apart from the year on year variations, there seems to be no particular trend of convergence or divergence. But once the figures are broken down into an urban and rural divide, and charted on a scatter diagram, a clear trend appears for the rural sector.

Figure 5.5.2 Provincial convergence/divergence, scatter diagram 1997-2010



Looking at figure 5.5.2, there is a clear sign of divergence in the inter-provincial rural areas. The reason the national sigma values do not reflect this trend, is because they are offset by a small rate of convergence in the urban areas. Given the larger weight afforded to the urban population, the national trend is of no convergence or divergence.

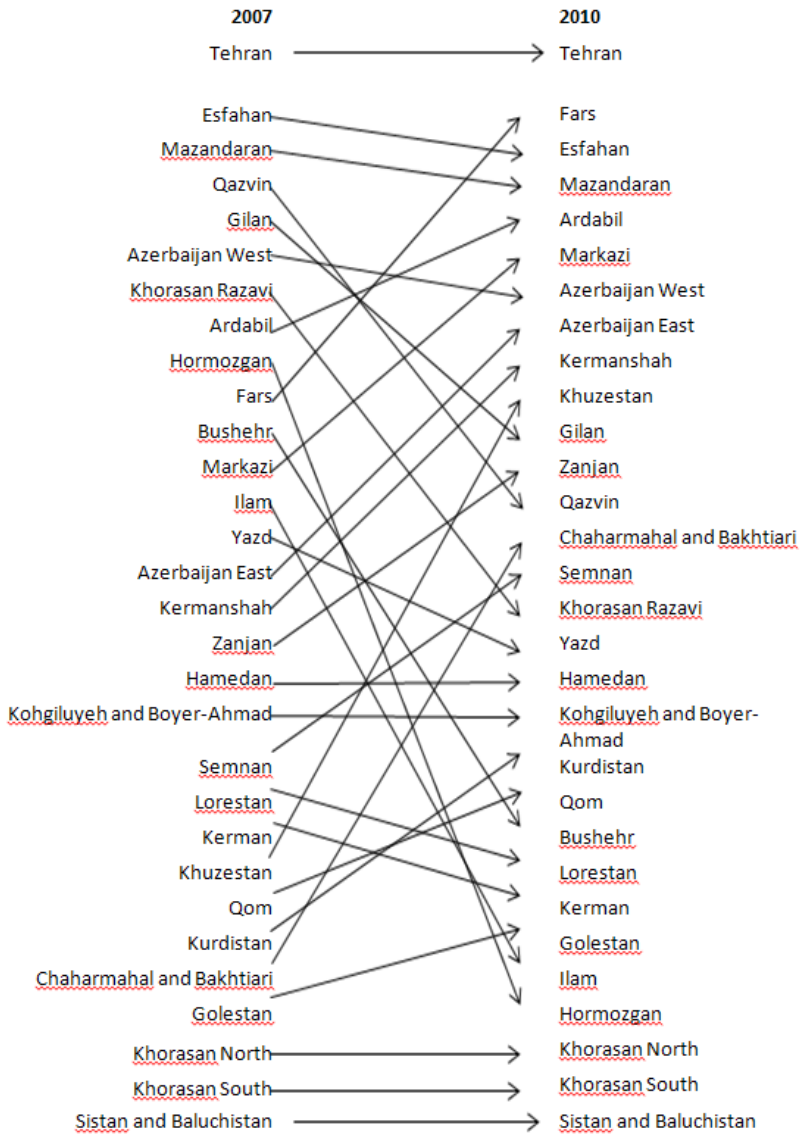
5.5.1 Provincial expenditure rankings

Although the sigma values provide useful information on the dispersion of the whole provincial distribution, it is not clear whether provinces tend to keep their household expenditure rankings in relation to each other year on year or do they alter places significantly. To find out, provinces were sorted according to their mean household expenditures for each year of the period 2005-2010[80]. The table of results is provided in appendix 5H.

The findings reveal that the very top and bottom provinces tend to keep their ranking, whereas the middle ranked provinces vary, change places regularly, and to a large degree. We can illustrate this, if rather messily, in figure 5.5.3. It is a snapshot of years 2007 and 2010 showing how the middle ranking provinces changed places significantly in just 3 years. Provinces are listed in order of household expenditure, with the highest being at the top. Notice how the top and bottom of the diagram is characterized by fairly straight lines, whereas the middle is crisscrossed and in many cases with long diagonal lines, indicating that provincial inequality in the middle of the distribution is fluid whereas it seems to be 'locked in' at the poles of the distribution.

[80] The period of 2005-2010 was chosen, as the number of provinces during this period remained uniform.

Figure 5.5.3 Inter-provincial rankings 2007 v 2010



The above results suggest that the poorest provinces seem to be stuck at the bottom, and the richest provinces, to a large extent, keep their position at the top.

Although we have found no significant national trend of inter-provincial convergence or divergence (although we have found rural divergence), the question which arises is whether there has been an increase in polarization during this period?

5.5.2 Polarization

Esteban and Ray (1994) distinguish between dispersion and polarization by citing how a group within a distribution can become increasingly homogenized with respect to a particular attribute but two different groups may be characterized by increasing hetrogeniety with respect to that attribute, leaving inequality unaltered within the distribution but increasing polarization. The Esteban and Ray (1994) equation has been used to measure for household expenditure inter-provincial polarization for the years 1990 and 2007.

$$P = \sum_{i=1}^{n}\sum_{j=1}^{n} \pi_i^{1+\alpha}\,\pi_j \left|e_i - e_j\right|$$

Where there are n provinces with the ith province having expenditure e_i and population π_i. The parameter α in effect denotes a weight for polarization. Esteban and Ray (1994, p.830) note that "intra-group homogeneity accentuates polarization". Higher values for α represent more intra-group homogeneity (Keefer and Knack, 2000), i.e. a higher weight for polarization. We set a value of 0.5 and 1.5 for α.[81]

Table 5.5.2 Inter-provincial polarization 1990 and 2007

Year	Urban $\alpha = 1.5$	Urban $\alpha = 0.5$	Rural $\alpha = 1.5$	Rural $\alpha = 0.5$
1990	0.110717	0.127542	0.087976	0.149082
2007	0.123704	0.122488	0.115080	0.135382

No notable increase is found in inter-provincial polarization between 1990 and 2007. Although if the polarization weight is set very high at $\alpha = 1.5$ [82] the degree of rural polarization seems to have increased slightly. Noorbakhsh (2003) conducts a similar study, although looking at regional consumption expenditure per capita and income per capita for

[81] If the parameter $\alpha = 0$ the equation is equivalent to the GINI coefficient.
[82] The maximum value for α is 1.6 ESTEBAN, J. & RAY, D. 1994. On the Measurement of Polarization. *Econometrica,* 62**,** 819-51.

the years 1991 and 2001 from household surveys. Although he finds no increase in polarization in rural areas, he finds more than a ten-fold increase in polarization in regional urban areas. Our results, although looking at a slightly different dataset both in terms of the years being studied and the variables, do not show a similar pattern. We find no pattern of increased inter-provincial urban polarization.

One clue may lie in the possibility that the 1991 dataset used by Noorbaksh (2003) could be flawed. Tabibian (2000) completely dismisses the 1991 household survey data as being erroneous and in his own study omits that particular year from his research (interpolating the data from the other years). Hence, this is an area which merits further empirical research.

Although we have found no evidence of increased polarization among the provinces as a whole, in the next section we pay attention to the gap between consistently the richest and the poorest province in our dataset.

5.5.3 The gap between the richest and poorest province

The urban dominance in Tehran

Immediately apparent from table 5.4.1, presented earlier in this chapter, is Tehran province's large share of the household population, accounting for more than a fifth of all Iranian households. A cursory glance at the overall mean expenditure highlights how, as expected, the province dominated by the capital city commands the highest overall household expenditure. However, this hides a more intricate picture.

For the year 2010, Tehran does not have the highest urban mean household expenditure, with Fars province being at the top. Tehran also only ranks 13th among the provinces in terms of rural household expenditure, slightly above the overall average. In fact both the mean urban and rural household expenditure is higher in Fars province than in Tehran, but due to the latter's much larger urban sector relative to its rural sector, the overall weighted expenditure mean is higher for Tehran. It is noteworthy then that Tehran's statistical hierarchical position in the inter-provincial rankings is largely due to the almost total urban dominance of the province. Its rural expenditure rankings are below many of the other top ranked urban provinces.

Although the finding of a high degree of urbanization in the primate city of Tehran supports the rentier theory's prediction of urban bias, the relatively lower rural income of households in Tehran and the fact that in 2010 it does not even command the highest mean urban expenditure, raises questions regarding the extent to which state rents benefit the capital city disproportionately.

Table 5.5.3 Tehran and Fars province, population & expenditure share, 2010

	Urban household population share	Rural household population share	Urban household expenditure share	Rural household expenditure share
Fars	66%	34%	78%	22%
Tehran	93%	7%	97%	3%

As can be seen from table 5.5.3, urban areas in Tehran province account for 93% of households, compared to the 66% in Fars province. There is even a higher dominance in Tehran's expenditure share with 97% of total expenditures arising from urban households. This dominance can 'skew' the overall weighted mean expenditure blotting out the plight of the rural sector, and in the year 2010 even obscuring the fact that Tehran did not have the highest urban household mean expenditure.

Sistan and Baluchistan

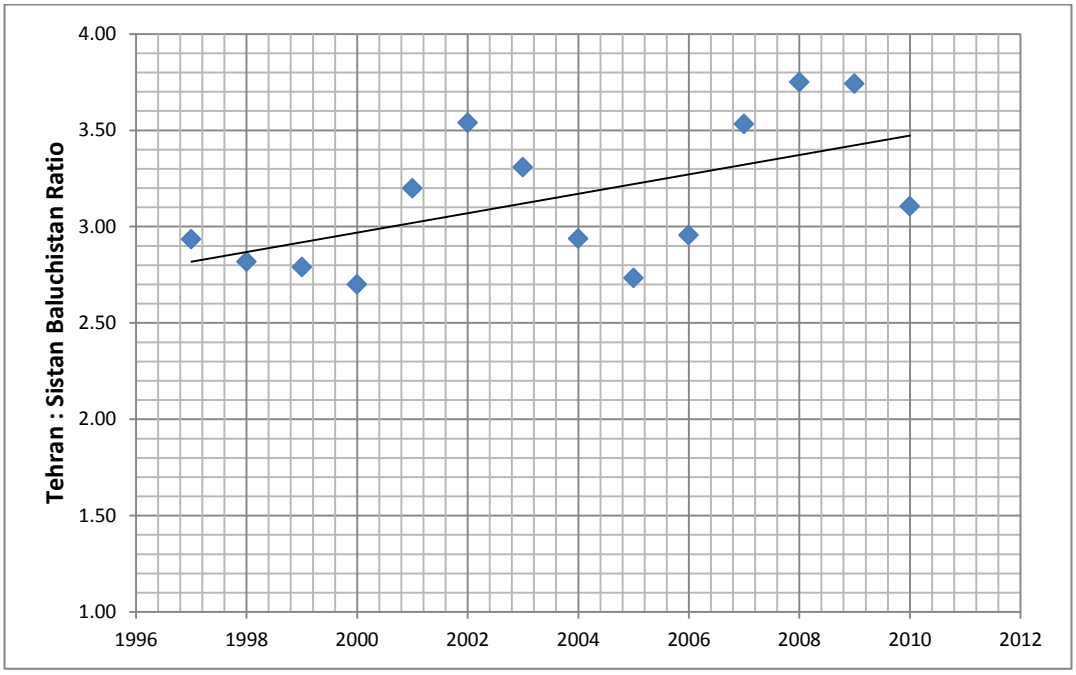
If there is any province which deserves targeted attention from policy makers, it is Sistan and Baluchistan. We have found that it consistently exhibits the lowest GDP/capita (with and without oil), the lowest scaled and non-scaled mean household expenditure, the lowest provincial UN HDI figure (0.54) (UNDP-BPO, 1999) and the most unequal provincial GINI (0.48)[83]. As you may have noticed earlier figure 5.4.1 the province also has a high number of children per household. As we will see in chapter six, in terms of ethnicity its mean household expenditure is diverging from both the dominant Persians and also all other non-Persian ethnicities combined.

A measure of polarization could still be hiding household expenditure convergence/divergence between consistently the top province in terms of expenditure, Tehran, and the lowest ranked province Sistan & Baluchistan.

[83] This is the latest calculated GINI figure for 2010.

Figure 5.5.4 Tehran : Sistan & Baluchistan mean household expenditure ratio

Weighted total of urban and rural. Expenditures scaled for household size



In figure 5.5.4 the ratio of the inter-provincial mean expenditure is charted on a scatter diagram. A table of the data is provided in appendix 5I. There is a considerable expenditure gap and some evidence of divergence. Although a pattern of divergence emerges, there are also signs of fluctuation during this period (similar to the national sigma chart); for instance despite the divergence trend, the figure for 2010 is actually similar to the figure for 1990 (not represented in the chart, see table in appendix 5I). We must also bear in mind that Tehran has a much larger urban population than Sistan & Baluchistan and this greatly affects the ratio. In fact the urban and rural ratios on their own are lower than the weighted total of both urban and rural areas.

5.5.4 Convergence and growth

The findings of this section should serve as a caution in the studies of convergence in predominantly rentier states. Due to the dominance of exogenous factors on growth in a rentier economy (Beblawi, 1987), picking a different snapshot pair of years may give rise to completely contradictory results when studying causation. To illustrate this point, we run a simple linear regression of the derived dispersion Sigma values on Iran's growth rate. We do this for two different periods, of 1997-2010 and also 2000-2007 and make a comparison. In effect we are looking at the effects of the growth rate on the convergence/divergence of Iran's provinces using a simple linear regression model.

$\sigma_i = b_0 + b_1 x_i + u_i$

Sample size = 14

where σ is the dispersion value, and x is the gdp growth rate.

Running the regression on the 1997-2010 dataset, we have a p value of 0.92 and a R^2 of .0009 Full results are presented in appendix 5J. For this period, the national growth rate is not at all significant in explaining the observed inter-provincial dispersion rates. But running the exact same regression for a different period of 2000-2007, we have a p value of 0.00 and a R^2 of .9113. Full results are presented in appendix 5K. For this latter period the national growth rate is highly significant in explaining the inter-provincial dispersion rates. Growth seemingly leads to inter-provincial divergence and not convergence.

Plotting this data on a chart, the reason behind such a large discrepancy becomes clear:

Figure 5.5.5 National sigma values and the GDP growth rate

Between the years of 2000 and 2007 there seems to be a positive correlation between growth and dispersion; more growth leading to more inter-provincial divergence. But this relationship breaks down when the broader dataset of 1997-2010 is utilized.

We can therefore conclude that no simple relationship exists between growth and inter-provincial inequality in Iran. Moreover, no general conclusions can be reached by picking a pair of snapshot years given the propensity of exogenous factors on growth in a rentier state and the lack of linkages with the domestic economy.

5.6 Concluding remarks

In this chapter we switched to a focus on horizontal inequalities by investigating Iran's inter-provincial inequalities for the years 1997-2010. The benefits and diverging results of using household expenditure data over GDP/capita figures, in a rentier state such as Iran, were demonstrated. As expected, high levels of provincial inequalities were found. These were accentuated by the use of scaled household data which accounted for differing family sizes between the provinces.

Our findings do not support the generally cited picture of a central rich region and poorer periphery regions. Instead, we find the poorest provinces to have high rural populations, although this explanation is not enough to determine why urban areas also have such a varied level of expenditures. For the period under study, there seems to be no national convergence, divergence or polarization of household expenditures. But when broken down into rural and urban sectors, a picture of divergence between rural areas and modest convergence between urban areas emerges. Despite a lack of overall divergence, the bottom and top placed provinces in the expenditure rankings, seem firmly rooted in place and there are signs of divergence between the richest province Tehran and the poorest province Sistan & Baluchistan.

Finally we find no simple relationship between growth and regional convergence in a rentier state such as Iran, with contradictory findings based on the period under analysis. In the next chapter we turn our attention to other manifestations of horizontal inequality within a rentier state, namely intra-provincial inequality differences (comparison of vertical inequality within provinces), the rural-urban divide, ethnic expenditure inequality and the inequality gap between the public and private sector.

6. Horizontal inequalities

6.1 Introduction

Following last chapter's focus on inter-provincial inequalities, the focus of this chapter will be on four other horizontal inequalities, intra-provincial, ethnicity, the urban/rural divide and the private and public sector. As noted in the last chapter there is a wide range of horizontal inequalities to investigate, but given the limited scope of this research, we have selected these four areas as we argue that they are of particular significance to Iran and have wider implications for rentier states as a whole.

We find a wide spread of within inequalities for the provinces; inequalities which are not directly related to expenditure levels or related to other provinces, pointing to more local deterministic factors. Unlike a previous intra-provincial study on Iran (Pesaran, 1976), researching a narrow period before the revolution, we find no evidence of Kuznet's inverted U shaped inequality curve for Iran's provinces. As with national vertical inequality, the urban-rural ratio is deemed a significant determinant of underlying intra-provincial inequality. There is some evidence of geographic clustering of inequalities for the urban sector.

Ethnic inequalities, though still persistent, seem to have decreased in scale; although the picture differs considerably between the ethnic regions. The urban rural divide is found to be growing in real terms and we make a number of comparisons between the internal distributions of the two sectors.

Finally we compare inequalities between public and private sector led households. We find a significant and growing advantage of public sector households over the private sector, although the proportion of public sector households is shrinking.

6.2 Inequality within the provinces

In this section, we will not be overly concerned with the political ramifications of our findings, and the focus will be on primarily measuring and analysing the distribution of income within the provinces.

Apart from standard economic concerns of unequal local income distribution and issues of political conflict, intra-provincial inequality is particularly significant in Iran when it comes to securing a job or a business contract. Iran has a traditional culture of family networking. If we assume (and this is not always the case) that families will tend to be closely bunched together in the overall income distribution, then a higher intra-provincial inequality can be to the relative detriment of future earnings for those at the bottom of the income scale, not only in absolute terms but also in terms of social mobility.

Provincial GDP per capita and aggregated mean household expenditure data at the provincial level hide the distribution of income within the province. Household expenditure micro data provides us with the benefit of finding out the distribution of expenditures within Iran's provinces.

Table 6.2.1 presents the GINI measurements for each of Iran's provinces in 2010. Three GINI figures are provided for each province, the urban, the rural and the combined measurement. Also included is the ratio of the mean urban to rural household expenditure for each province.

Table 6.2.1 Urban-Rural expenditure ratios and provincial GINI, 2010

Sorted by combined GINI, ascending order

Province	Combined urban and rural GINI	Urban GINI	Rural GINI	Ratio of mean urban to rural expenditures
Qom	0.32	0.32	0.37	1.36
Zanjan	0.33	0.33	0.29	1.46
Kurdistan	0.33	0.31	0.31	1.65
Qazvin	0.34	0.31	0.36	1.61

Ilam	0.36	0.34	0.33	1.61
Semnan	0.36	0.35	0.34	1.63
Azerbaijan West	0.37	0.35	0.34	1.63
Mazandaran	0.37	0.35	0.34	1.59
Gilan	0.37	0.33	0.37	1.69
Yazd	0.37	0.35	0.42	1.42
Bushehr	0.37	0.36	0.34	1.61
Chaharmahal and Bakhtiari	0.37	0.35	0.33	1.75
Esfahan	0.37	0.37	0.36	1.57
Azerbaijan East	0.38	0.36	0.36	1.73
Ardabil	0.38	0.37	0.35	1.56
Khuzestan	0.39	0.37	0.30	1.99
Kermanshah	0.39	0.37	0.37	1.77
Tehran	0.39	0.38	0.31	2.4
Khorasan South	0.40	0.37	0.29	2.21
Kerman	0.40	0.37	0.37	1.81
Khorasan Razavi	0.40	0.37	0.38	2.06
Hamedan	0.41	0.38	0.33	2.11
Hormozgan	0.42	0.34	0.34	2.49
Fars	0.42	0.39	0.39	1.81
Khorasan North	0.42	0.39	0.34	2.15
Lorestan	0.42	0.39	0.30	2.35
Markazi	0.43	0.39	0.45	1.98
Kohgiluyeh and Boyer-Ahmad	0.44	0.42	0.29	2.57
Golestan	0.45	0.42	0.37	2.23
Sistan and Baluchistan	0.48	0.43	0.41	2.58

The first noticeable characteristic of the provincial GINI figures is the wide range, from 0.32 to 0.48. This is equivalent to the inequality difference between relatively low income inequality Canada and the very high income inequality South American country of Peru. Clearly the provinces have very different expenditure distributions and further research is warranted to investigate possible determinants for such a large difference.

In this section, we do take a look at a variety of factors, but this list is by no means exhaustive as we are concerned with identifying patterns rather than determinants per se. In order to guard against the year of 2010 being an anomaly, or suffering from a sampling error, the analysis was carried out for all the years of 1997 to 2010. The results are presented in appendix 6A.

Although we cannot rule out the possibility and indeed probability of provincial sampling errors for certain years, looking at the pattern of the dataset as a whole, the annual standard deviation of the GINI coefficients suggests that although intra-provincial inequalities have fluctuated, the dispersion has remained consistent. The wide range of GINI coefficients has also remained consistently high giving rise to a difference of between 0.12 and 0.20 for the lowest and highest GINI. The mean provincial GINI has fluctuated between 0.38 and 0.40. We can deduce that for the whole period under study, there has been a wide gulf between the within inequality distribution of the individual provinces.

6.2.1 Are annual intra-provincial GINI alterations related?

Although the underlying GINI figures vary, pointing to a local explanation for the observed inequality, a question which arises, is whether the year to year fluctuations are independent of another or related to other provinces. If there is a high degree of correlation this would suggest that changes in the observed variations may largely be due to national factors rather than localized ones. To test for this we run a correlation between all the provinces for the

year 1998 to 2010[84]. The full set of results is presented in appendix 6B. The correlation findings are not significant, indicating that year on year changes of within provincial inequality are not directly related to each other.

We find that year on year fluctuations in provincial expenditure distributions seem to be largely independent of one another. Thus even if national factors determine these fluctuations, individual provinces are impacted by them to a different degree due to local determinants.

If we assume that local determinants are integral in explaining the underlying provincial inequality, these findings also support the rentier theory's assumption of few linkages of the local economy with the oil industry. The oil rich provinces of Khuzestan, Ilam, Bushehr and Kohgiluyeh and Boyer-Ahmad have wide varying GINI figures as is the case with other provinces. They do not display higher GINI figures, as might have been expected if oil rents were directly and disproportionately accruing to the local population.

6.2.2 Inequality and mean household expenditure

Correlation tests also indicate no direct relationship solely between the mean provincial household expenditures and the associated GINI. See appendix 6C. We cannot therefore assert that provinces are less or more unequal solely based on mean expenditure levels.

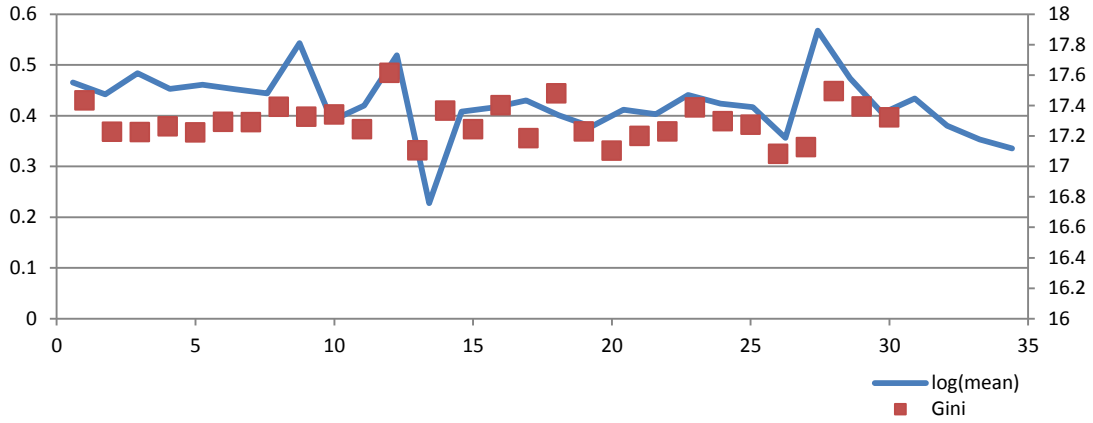
Figure 6.2.1 shows the log means of household expenditure for each province alongside their associated GINI coefficient for 2010. The province with the highest inequality is actually the poorest, Sistan and Baluchistan with a very high GINI of 0.48, whereas the 5th poorest province Ilam has a relatively low GINI of 0.36. There are rich provinces such as

[84] Please note that the province of Khorasan was subdivided into three povinces in 2005 by the annual household survey. In this particular correlation calculation we have only used the results of the most populous of these 3 provinces (Khorasan Razavi) and ignored the other two. The reason for choosing 1998 rather than 1997 as the starting date is to avoid the complication of two other provincial alterations between 1997 and 1998.

Fars and Markazi with a high inequality and others such as Mazandaran and Esfahan with relatively lower inequality.

We also tested for a correlation between variations in mean expenditure and the GINI of individual provinces for 1997-2010. This was carried out for the four most populated provinces Tehran, Khorasan Razavi, Esfahan and Fars. Results are presented in the appendix 6D. No significant correlation was found for any of the provinces. Therefore, annual income distribution variations do not seem to be directly and solely linked to variations in the mean household expenditure.

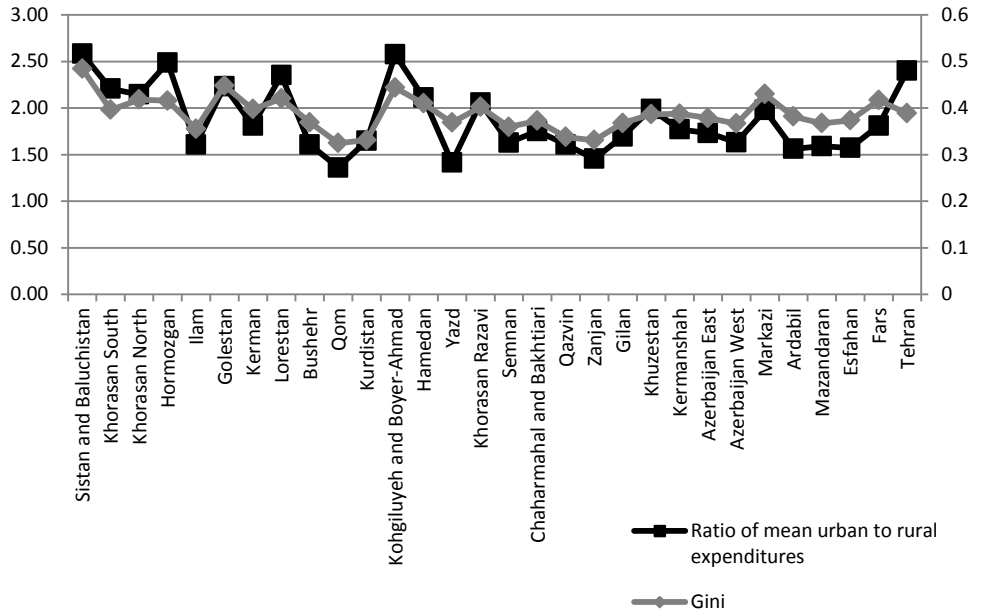
Figure 6.2.1 Log mean of household expenditure and associated GINI, 2010



6.2.3 Urban to rural ratio

Apparent from the 2010 figures and also prevalent in the previous years under study is the slightly lower level of rural inequality relative to urban inequality for most provinces. But even more apparent is the much higher level of overall provincial inequality (weighted combined inequality of urban and rural areas) over the individual urban and rural sectors. For example Sistan and Baluchistan province has an urban and rural GINI of 0.427 and 0.412 respectively. But this jumps to 0.484 for both sectors combined. This suggests that the urban to rural mean expenditure plays a significant factor in determining the overall provincial inequality. This becomes visually apparent if we chart a graph of urban to rural expenditure ratio for each province alongside its associated GINI.

Figure 6.2.2 Urban-Rural expenditure ratios and provincial GINI, 2010



Similar to the national GINI figures and the relationship between urban and rural mean expenditures, at the provincial level the chart above suggests that the urban-rural divide is evident in the differing provincial expenditure distributions.

In fact there is a 0.83 positive correlation, significant at the 1% level between the urban: rural ratio and the provincial GINI. Although this in itself does not explain the determinants of the provincial inequality figures observed, it does point to one of the factors of significance.

Also significant is the income and population share of the rural and urban sector in the province as this determines the likely impact of the urban to rural divide on inequality as a whole. For provinces where the proportion of the rural population and income is small such as Qom and Tehran, then the GINI figure is not affected significantly by this urban/rural divide. It is important to reaffirm that this is only one significant factor in explaining the intra-provincial inequality as it cannot be used to explain the widely varying income distributions within solely the urban or rural sectors of each province.

6.2.4 Kuznets and the rentier state

The different level of mean expenditures and wide varying income distributions of these separate provinces, but operating under the same administrative and commercial conditions, present an opportunity to test for Kuznet's relationship between inequality and level of income.

Our extension of rentier theory would suggest that this non-linear relationship should not exist. This exercise was indeed carried out by Pesaran (1976) on Iran's provinces for the year of 1971. We use the same model as Pesaran (attributed to Ahluwalia[85]) for comparative purposes for the year 2010.

GINI = $\alpha_1 ur + \alpha_2 y + \alpha_3 y^2 + \mu$

Where

y is the log mean household expenditure

ur is the uran:rural expenditure ratio

For the inverted U-shaped Kuznets relationship we would expect the coefficient of y to be positive and that of y^2 to be negative.

GINI	Coef.	Std. Err. t	P>t	[95% Conf.	Interval]
Ur	0.077247	.0129286 5.97	0	0.050672	0.103822
Y	-2.1501	1.710983 -1.26	0.22	-5.66708	1.366873
y2	0.061482	.0491532 1.25	0.222	-0.03955	0.162518
_cons	19.03743	14.89977 1.28	0.213	-11.5895	49.66434

The only variable of significance is the Urban to Rural ratio. The y^2 is actually positive not negative (although not significant). Unlike Pesaran (1976) (looking at 1971) we find no evidence of Kuznet's theory for 2010, almost 40 years later. However, interestingly these

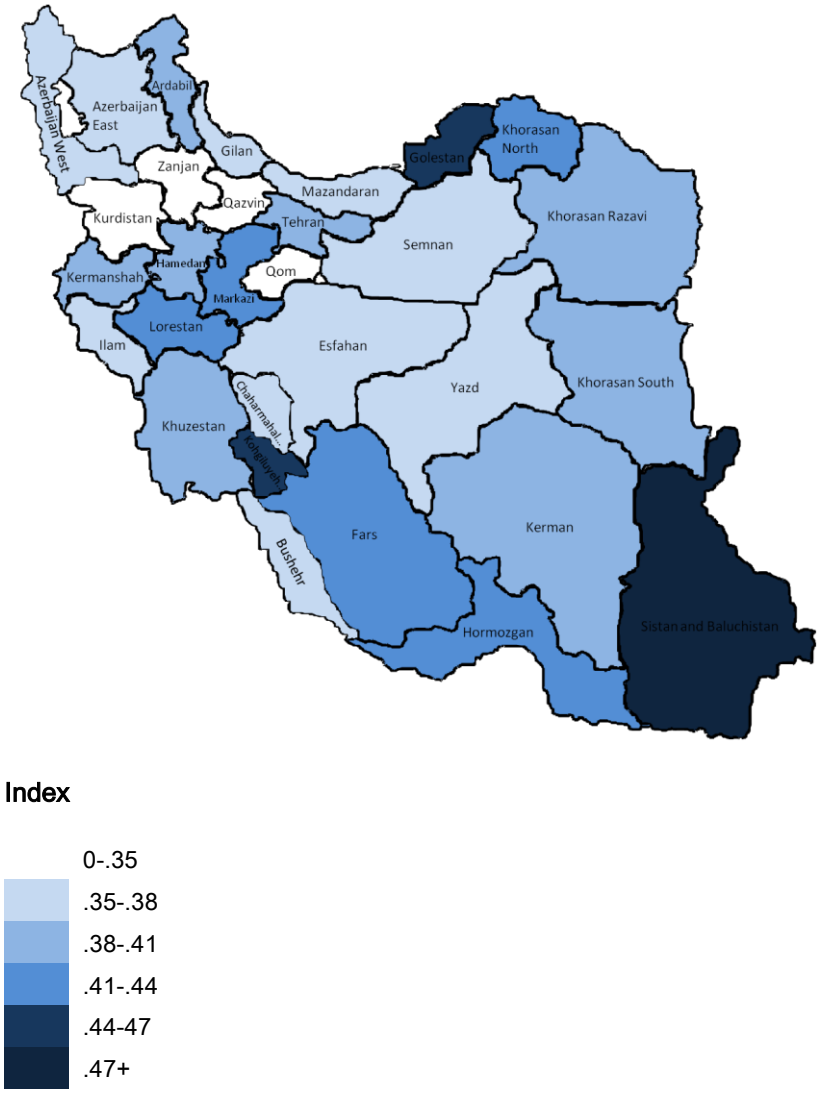
[85] *Ahluwalia*, "*Income Inequality*: Some Dimensions of the Problem," in H. Chenery, et al., eds., Redistribution with Growth (London: Oxford University Press, 1974)

findings are in keeping with Pesaran's overall conclusion (1976, p. 277) that "there are considerable variations in regional expenditure inequality" and which also point to the urban:rural expenditure ratio as an important determinant of intra-provincial inequality.

6.2.5 The geography of intra-provincial inequality

Below we have drawn thematic maps based on Iran's intra-provincial inequality for 2010. The overall inequality map, which is dominated by urban inequality due to the higher share of the urban population, seems to indicate a degree of provincial clustering.

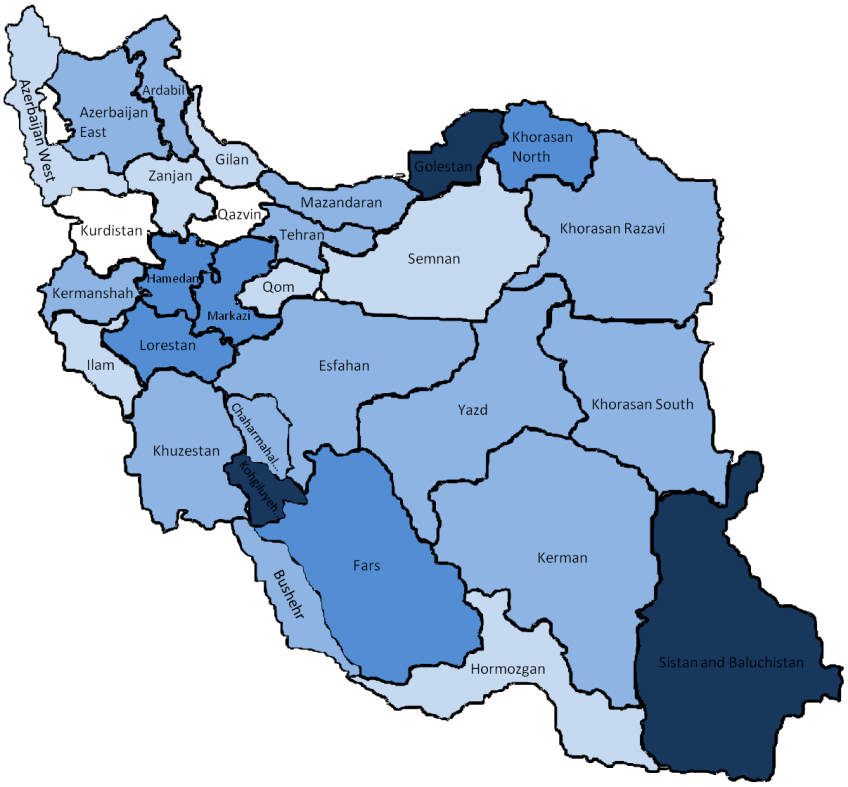
Figure 6.2.3 Provincial GINI (rural and urban weighted), thematic map 2010



Index

0-.35
.35-.38
.38-.41
.41-.44
.44-47
.47+

Figure 6.2.4 Urban provincial GINI, thematic map 2010

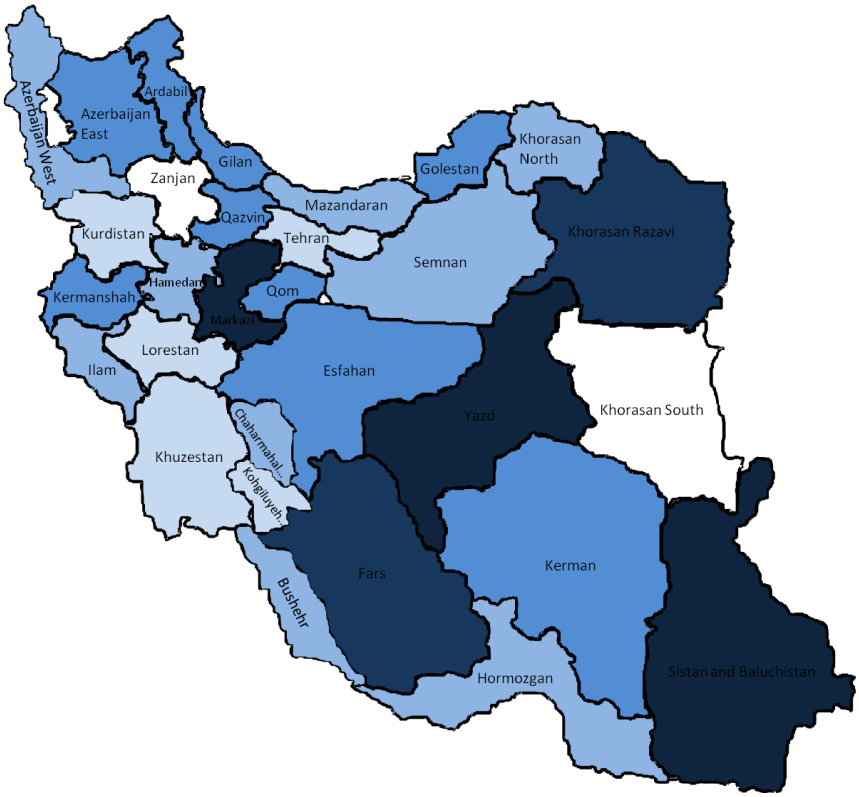


Index

	0-.32
	.32-.35
	.35-.38
	.38-.41
	.41-.44
	.44+

Notice how the low inequality provinces of Kurdistan, Zanjan and Qazvin are grouped together. Similarly the central provinces of Esfahan, Semnan and Yazd display the same level of inequality as do the eastern provinces of Khorasan Razavi, Khorasan South and Kerman. The southern provinces of Hormozgan and Fars also fall in the same inequality grouping. However, this clustering largely comes to an end when looking at rural areas.

Figure 6.2.5 Rural provincial GINI, thematic map 2010



Index

	0-.29
	.29-.32
	.32-.35
	.35-.38
	.38-.41
	.41+

Numerous adjoining provinces have contrasting inequality distributions. This geographic representation of intra-provincial inequality hints at rural areas being isolated, with few linkages and a lack of integration with adjacent regions. The visual representation of inequality within rural provinces also seems to indicate a higher range and contrast of inequality than urban areas. This is indeed borne out by the data, which indicates a higher standard deviation for the rural GINI coefficients than the urban ones (0.039 v 0.030) and a bigger difference between the highest and lowest GINI (0.16 v 0.12). This is despite the mean rural GINI being lower than the mean urban GINI.

In conclusion to this section, the wide range of within provincial inequality seems to be clustered at an urban level but dispersed among rural areas. This seems to support the rentier theory of urbanization clustering at the expense of an isolated rural sector (Wick and Bulte, 2006).

6.3 Ethnic inequality findings

The ruling elite in a rentier state, the favoured classes and burgeoning urban centres may be dominated by a particular ethnicity. In this section we explore whether the Persians are improving their economic wellbeing in Iran relative to other ethnicities and how all other ethnicities are performing in relation to each other.

Ethnicity is often defined in terms of language, race and/or religion. For the purposes of this study, our definition of ethnicity is different, though nominally based on race and language it is actually shaped by geography. It views ethnicity as a 'geographic environment' where a particular race or language is dominant. This builds on the ideologies of "cultural capital" and "ethnic capital" which put environment at the forefront of ethnic studies, as described by (Robinson, 2002, p.3) [86]. In essence, we are looking at all households, regardless of individual ethnicity, which are located in a geographic region dominated by a particular ethnicity, rather than the individual ethnic makeup of a household.

To a large extent this definition has been forced on us due to the lack of ethnic micro data availability in Iran's annual household surveys, the ten year census or indeed the lack of any other major nationwide survey relating to ethnicity. However, our approach does actually fit rather well into the "ethnic capital" concept. From an empirical point of view, not taking a geographic approach can also be fraught with difficulties as defining the race of an individual or a household can be problematic. Inter-marriage, fading ethnic identification of second generation migrants and a lack of identifiable ethnic communities and networks can make ethnic divisions inaccurate. For instance in the capital city Tehran there are a wide variety of ethnicities present and have in the most integrated.

[86] Robinson (2002) attributes the notion of "cultural capital" to JOHNSON, H. G. 1973. *The theory of income distribution,* London, England, Gays-Mills. and that of "ethnic capital" to BORJAS, G. J. 1999. *Heaven's Door: Immigration Policy and the American Economy*, Princeton University Press.

Unlike Tehran, fifteen of Iran's thirty one provinces can be defined by their distinct ethnic dominant populations (See table prepared below)[87]. Therefore, in Iran's case, sustained inter-provincial differences can result in entrenched differing economic fortunes not just between geographic regions, but more critically between distinct ethnicities.

Table 6.3.1 Iran's ethnically dominant provinces

Ethnicity	Predominant provinces*
Azeris	East Azerbaijan, Ardabil, Zanjan,
Kurds	West Azerbaijan, Kermanshah, Kurdistan, Ilam
Lurs/Bakhtiaris	Lorestan, Chaharmahal and Bakhtiari, Kuh-Gilu-Boir Ahmed
Arabs	Khuzestan
Baloochis	Sistan and Baluchistan
Turkmens	Golestan**
Gilaks	Gilan
Mazandaranis	Mazandaran

Source: Multiple sources have been used to prepare this table.

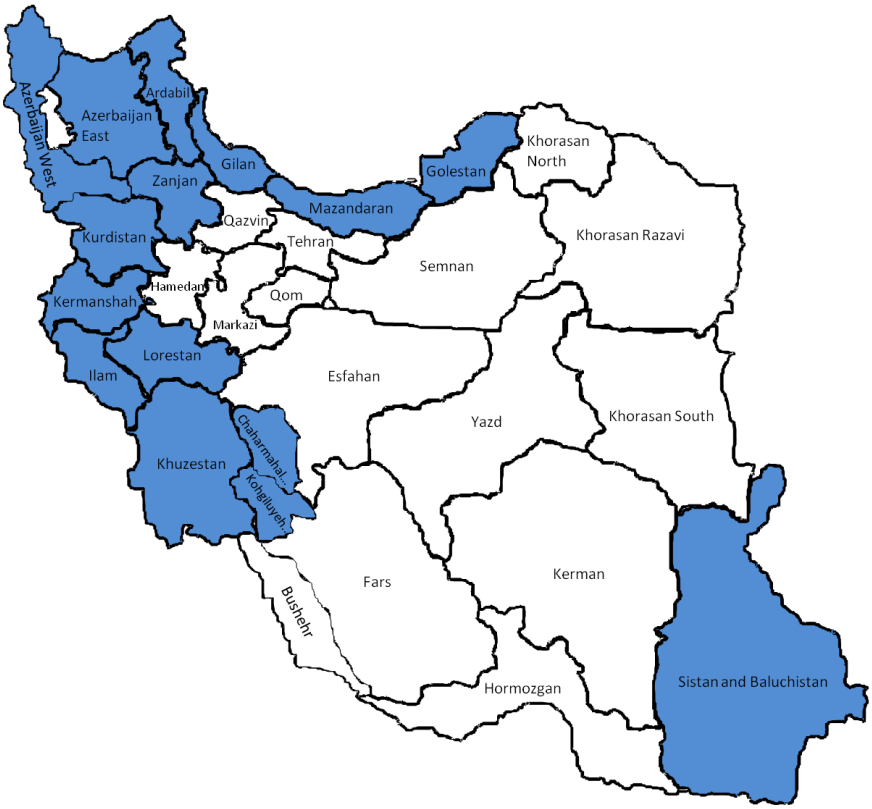
* The provinces listed are the ones which are *primarily dominated* by the referenced ethnicity. Please note that these ethnicities may also prevail in other provinces.

**The south of Golestan province is dominated by Persians

[87] The other 15 provinces are treated as being dominated by Persians.

Figure 6.3.1 Map of the ethnically dominated provinces

Ethnic provinces are shaded, non-ethnic (Persian) dominated provinces are presented in white



Pre-revolution (Aghajanian, 1983) and post revolution (UNDP-BPO, 1999) regional studies point to the generally accepted consensus that ethnic provinces are relatively more deprived. These studies look at a wide range of measures such as education, job opportunities, natural resources and health indicators. Our focus remains on household income (expenditure) inequality.

While some authors (Torof, 2004) cite ethnic prejudice itself as a cause for inter-ethnic economic inequalities in Iran, others such as Aghajanian (1983) do not see ethnicity itself as the cause of the ethnic inequality, but more as an effect of political and economic centralization with an urban and regional bias towards the central Persian[88] provinces. The ethnic regions are generally more reliant on rural areas through agriculture, than the Persian

[88] The word 'Persian' is used in the context of ethnicity here.

regions, as the calculations later in this section will show. Iran's placement of non-agricultural industrialization at the heart of its development plans has not only affected provincial inequality but it has exacerbated the inter-ethnic divide.

In Iran's rentier economy this bias was further aggravated, by a shift from the 1960s "in the source of governnent [sic] expenditure from domestically generated revenue to foreign loans and oil revenue" (Aghajanian, 1983, p.221). Although Iran's oil fields are predominantly located in the ethnic provinces of Khuzestan, Hormozgan and the Caspian region, given the lack of linkages between the oil industry and the local economy (Mahdavy, 1970), effective control of oil revenues lies in the hands of the political administration in Tehran. Bjørnskov (2008) asserts that political ideology of government to some extent determines the relationship between income inequality and growth, adversely under right wing governments and favourably under left wing governments. It seems that in Iran's case, it is more the 'rentier' nature of the state and its resultant urban bias which has affected ethnic inequality.

Coupled with industrialization policies with an urban bias (Dreger et al., 2007), peripheral ethnic regions are disadvantaged economically. Eleven of Iran's fifteen ethnic provinces lie in the extreme periphery. In short, it is argued that ethnic provinces have suffered, on both counts of reliance on agriculture, and being located in the periphery rather than the central plateau[89]. Both these disadvantages have been accentuated by the rentier effects of urban bias industrialization and the disbursement of the vast share of investment revenues via the primate city, Tehran. In addition, networking is deemed more effective within groups of the same ethnicity (Stewart, 2001, p.4). In an economy where networking plays a large part in advancing economic fortunes, members of lesser advantaged groups in Iran face a networking disadvantage. If there is a lack of mobility between these groups, ethnically defined provinces may find it difficult to catch up.

[89] In chapter five, we find that the central v periphery characterization of inequality among Iran's provinces is overly simplistic.

The question which then arises, is whether in recent years, the ethnic regions have indeed been economically disadvantaged compared to Persian regions in terms of household expenditure and if so, whether this relationship is improving or worsening in their favour.

To test for this, we have selected provinces which are dominated by a particular ethnicity and grouped them together to assess inter-ethnic inequalities. For example the ethnic Lurs, are deemed to be dominant in the Lorestan, Chaharmahal and Bakhtiari, Kuh-Gilu-Boyer Ahmed provinces. These three provinces have been grouped together according to their respective sampling weights to represent the Lur dominated grouping. Equivalence household expenditures are used, accounting for the difference in the household size, adults and children. Difference equivalence scales have been used for rural and urban households. This has been carried out for eight major ethnicities in Iran, as well as the dominant Persians, on an annualized basis for the period of 1998-2010. We have measured the inequality between the dominant Persian provinces and the dominant Ethnic provinces. We have also measured the inequality between the various ethnic provinces themselves. We are able to report on how each ethnic grouping has fared against the Persians and against all the other ethnicities combined (excluding the Persians).

Given our 'environmental' definition of ethnicity, it is noteworthy to point out a number of caveats regarding our approach of assessing inter-ethnic inequality using purely administrative provincial borders.

1. We are using provincial borders for our study. There may be enclaves of an ethnic group which are not affected by the dominant ethnicity.
2. Although for certain provinces the dominant ethnicity is clear cut, due to the lack of data availability, in a few cases, it can be difficult to define an ethnically dominant province or group of provinces. For example is West Azerbaijan province dominated by Kurds or Azeri Turks? (We opted for Kurds). What is the percentage of Arabs

living in Hormozgan province? (We opted for a non-dominant percentage and did not treat it as ethnic).

3. If all of Iran's counties (districts within the provinces) had been present in the sample and weighted appropriately for the period of study 1998-2010, it would have been possible to have a more accurate geographic breakdown of the ethnicities.
4. Our study does not represent ethnicities which do not dominate a whole province, such as the Qashqais, Georgians, Pashtuns or Armenians nor the numerous religious minorities.

6.3.1 Ethnic / Persian inequality

Rural and urban share by ethnicity

Before presenting the inter-ethnic mean household expenditure comparison, it is pertinent to look at the ethnic and Persian rural and urban share of the household population and expenditure.

Table 6.3.2 Ethnic urban and rural share, 2010

	Urban Pop	Rural Pop	Urban expenditure share	Rural expenditure share
Persian	79%	21%	89%	11%
Ethnic	64%	36%	76%	24%

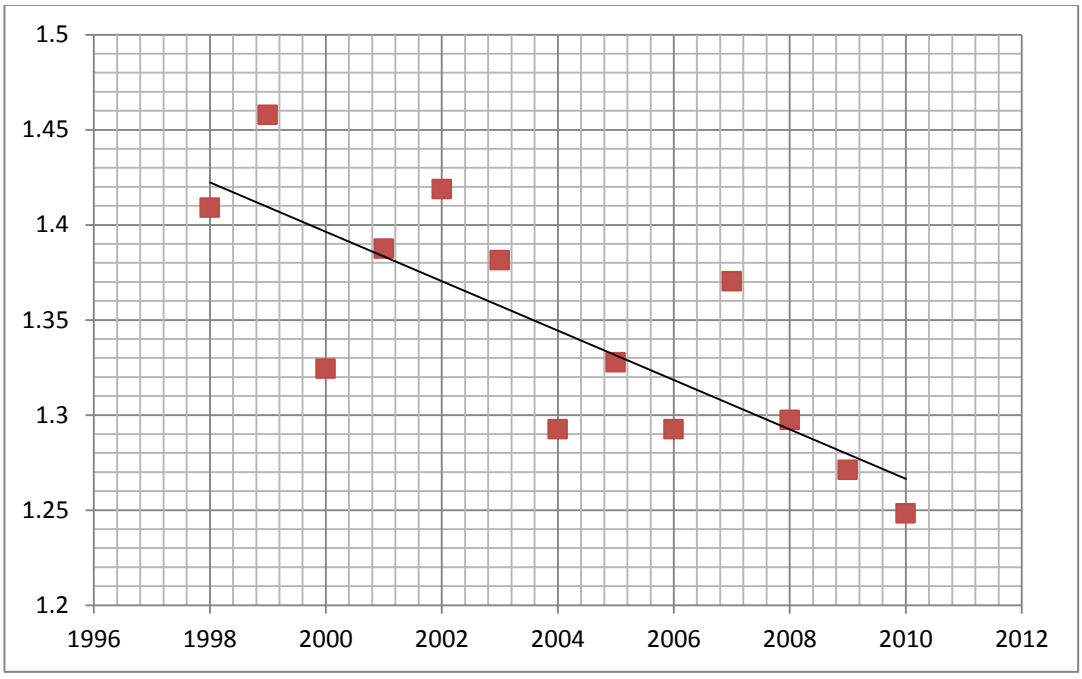
Table 6.3.3 Ethnic urban and rural share, 1998

	Urban Pop	Rural Pop	Urban expenditure share	Rural expenditure share
Persian	70%	30%	84%	16%
Ethnic	55%	45%	66%	34%

These figures support Aghajanian's (1983) assertion of the central Persian regions being more urbanized than the mostly peripheral ethnic regions. For the last year of our study 2010, the rural income share in the ethnic regions is just more than double that of the Persian regions. It is a similar situation in the first year 1998, with 34% of the income for the ethnic regions deriving from the rural regions rather than the 16% for the Persian regions. The figures also reveal that both ethnic and Persian regions have increased their share of urban population and expenditure share during this period.

The full set of results for ethnic mean household expenditures for 1998-2010 are presented in appendix 6E. Below we take a look at a number of notable findings.

Figure 6.3.4 Persian : Ethnic mean household expenditures, 1998-2010



As can be seen in Figure 6.3.4 the ratio of mean household expenditures of Persian to ethnically dominated regions has been falling steadily, although there is still a significant difference in 2010 by a factor of 1.25.

We can break down this trend further by comparing the urban and rural regions of the Persian and ethnic groups separately. After this breakdown, it becomes clear that mean

household expenditures in rural regions of Persian and Ethnic regions do not differ significantly and have not changed in relation to each other for the period under study.

It is clearly the urban areas which have been solely responsible for the reduction in the expenditure ratio of Persian to ethnic regions. The ratio of Persian to ethnic expenditures in urban areas has fallen from a high of 1.4 to less than 1.2. We can conclude that the ethnic horizontal inequality between Persian and ethnic dominated provinces is solely an urban one and it is an inequality, while still substantial, which has been proportionally decreasing between the two groups.

Figure 6.3.5 Persian : Ethnic mean household expenditures, 1998-2010 rural

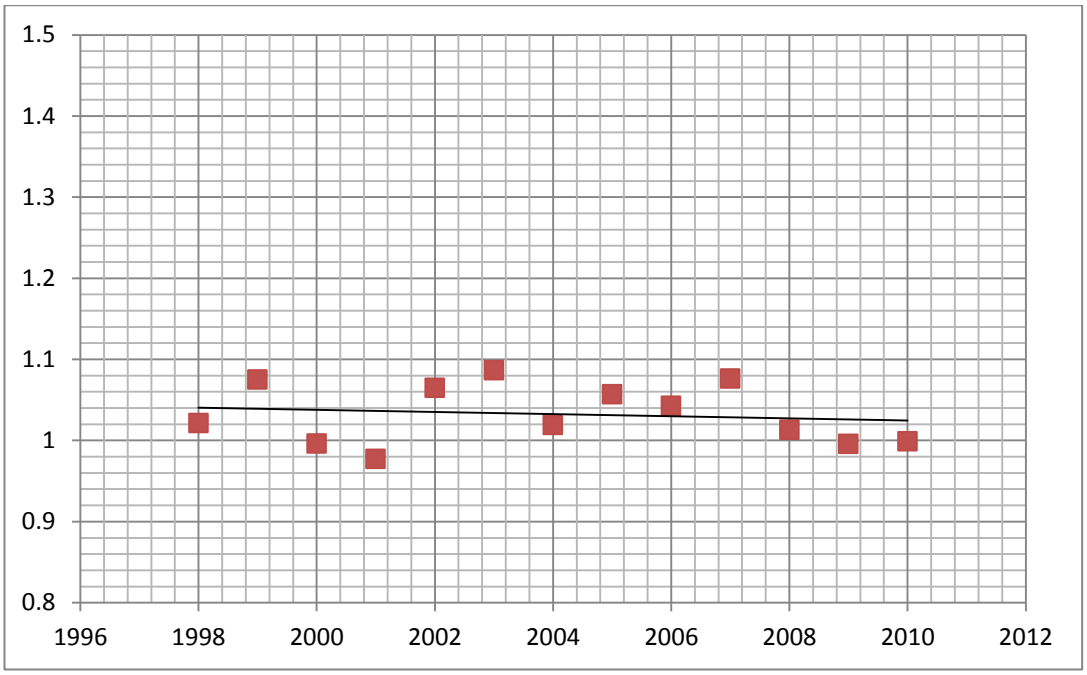
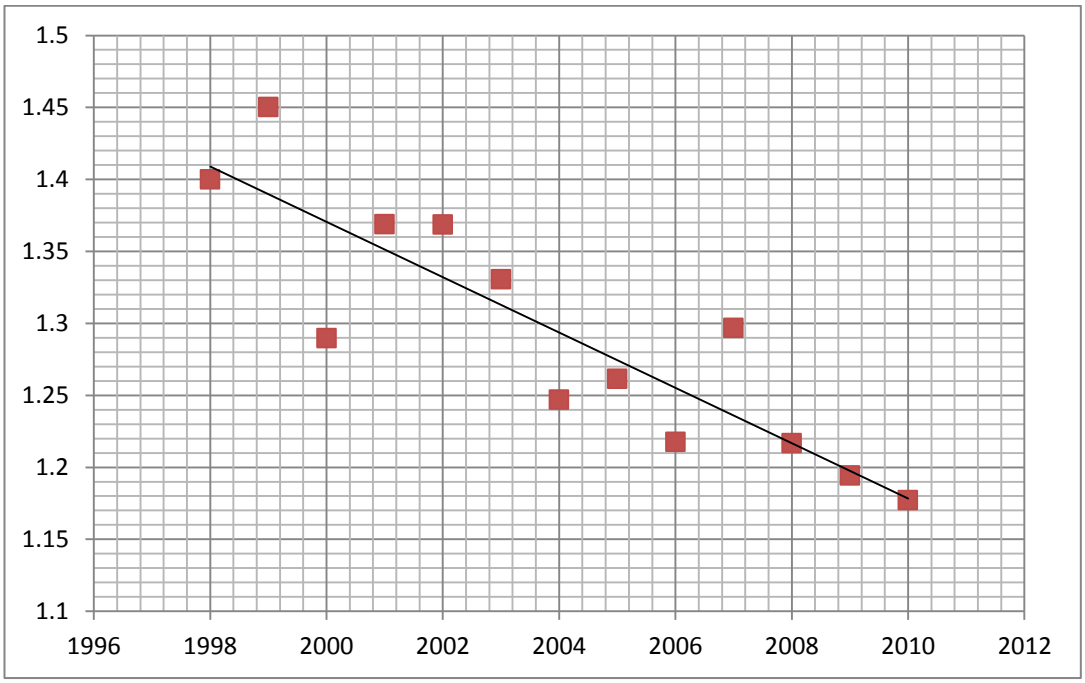


Figure 6.3.6 Persian : Ethnic mean household expenditures, 1998-2010 urban



6.3.2 Internal income distribution of ethnic regions

Expenditure inequality is slightly lower within the ethnic than the Persian provinces. Although this is partly due to the larger ethnic rural component, the lower GINI is also in existence for the urban regions. This should not be interpreted as the ethnic provinces being more homogenous than the Persian ones as the difference for 2010 is only 0.015 on the GINI index and the variations within the ethnic grouping are considerable.

In fact the province with the highest GINI inequality 0.48, Sistan & Baluchistan, is within the ethnic grouping, as is Kurdistan which has a relatively low GINI of 0.37 (low compared to other ethnicities). The intra-ethnic inequality measurements negate the notion of ethnic income homogeneity in Iran with all the major ethnicities displaying relatively high GINI coefficients throughout the period under study. Intra-ethnic GINI figures are provided in appendix 6G for 1998-2010.

6.3.3 Ethnic regional convergence

While we have looked at the ethnic grouping as a whole, we can break down this further to investigate how different ethnicities have performed in relation to each other and to the Persians during this period. While the ethnic grouping in effect was a weighted average of the major ethnic regions, we will now test for ethnic Simga (σ) convergence between all the ethnic regions (including the Persians) between 1998-2010, while treating all regions equally. We are testing to see whether ethnic mean household expenditures have tended to converge during this period. The Simga (σ) convergence methodology utilized is the same as the inter-provincial convergence demonstrated in chapter five.

Figure 6.3.7 Sigma divergence of all nine ethnic regions (including Persians)

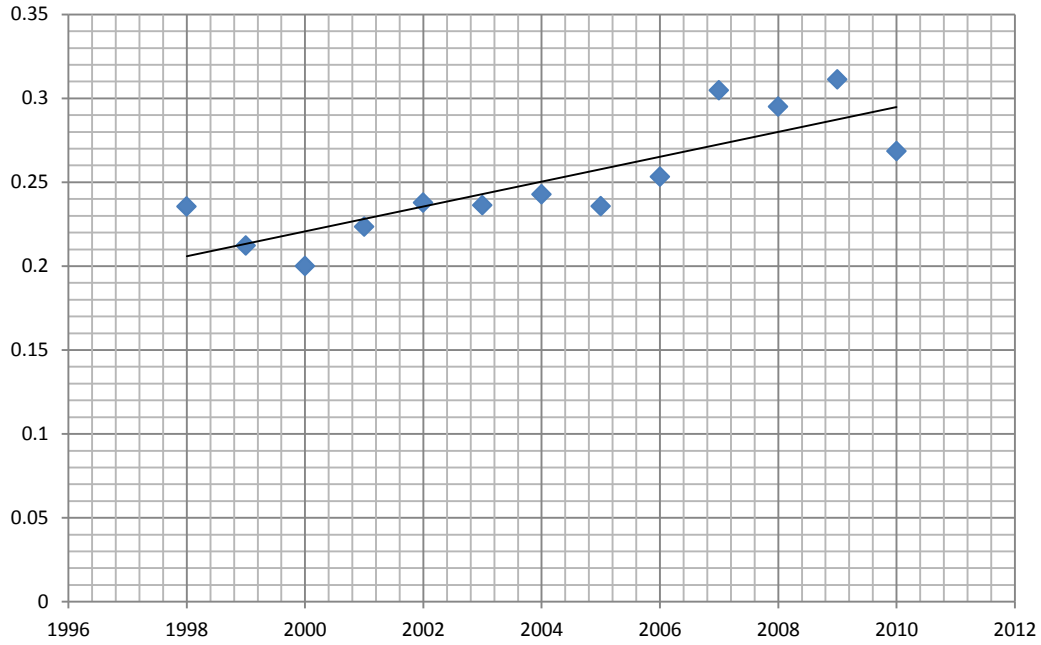


Figure 6.3.8 Sigma convergence for 8 ethnic regions (excluding Baloochis)

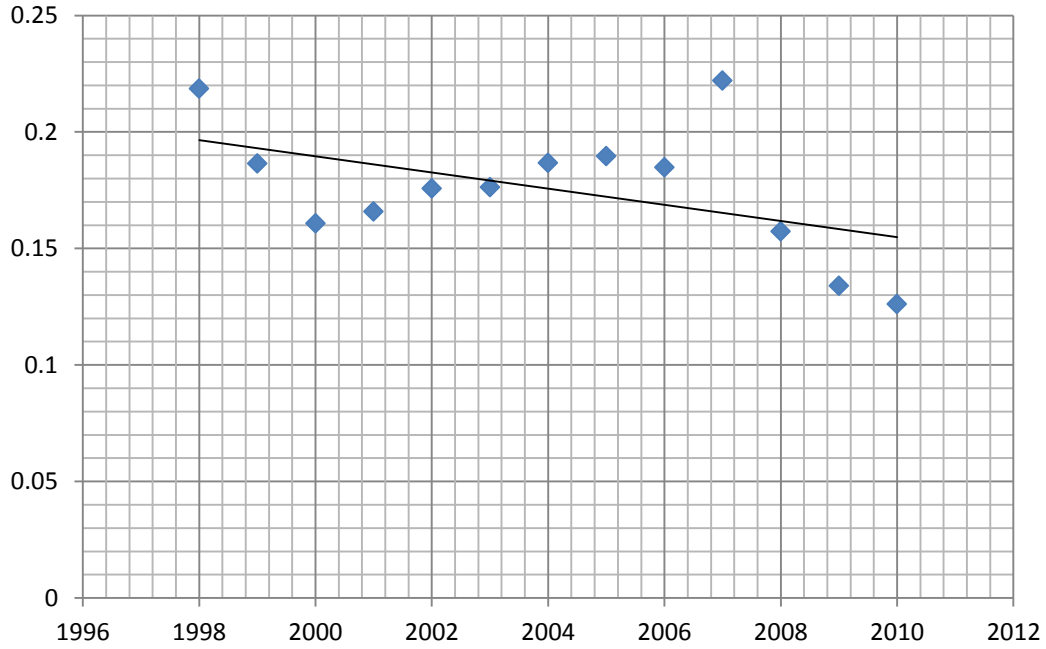


Figure 6.3.7 shows the sigma results for all the ethnic regions. It is clear that not only is there no convergence between the ethnic regions, there even appears to be a slight divergence. At first this may seem like a contradiction to our existing finding that the Persian to ethnic mean household expenditure ratio has been steadily decreasing. But in the sigma convergence analysis we are treating all ethnic regions equally, rather than taking a weighted average, as in the case of the aggregate ethnic grouping.

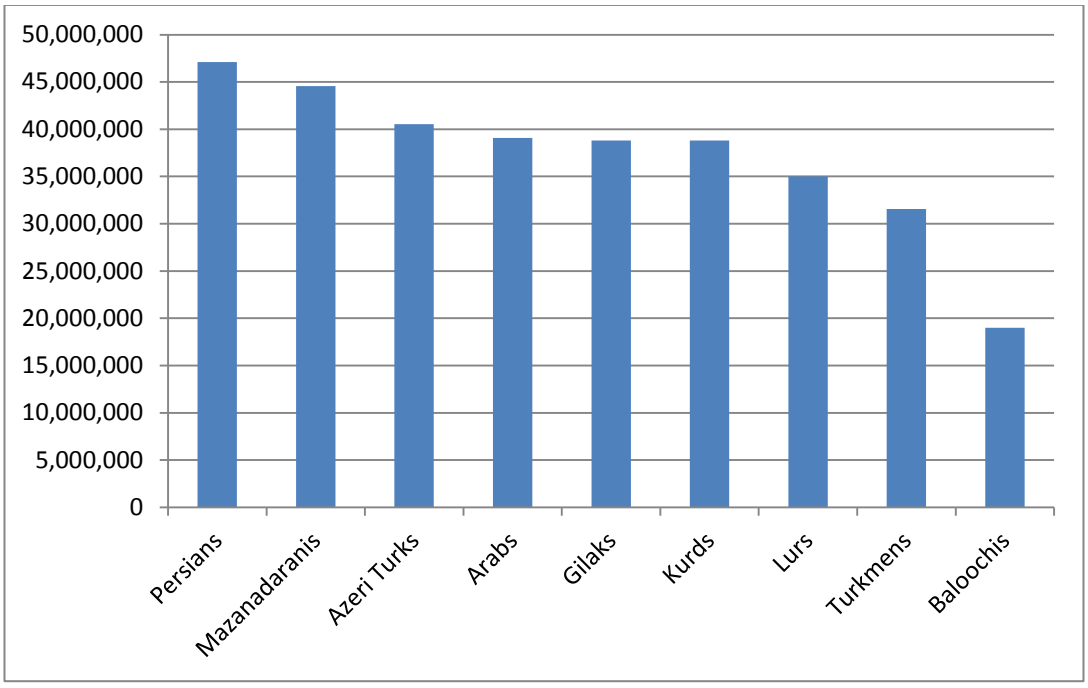
This distinction becomes clear, when we remove the Baloochi ethnic group from the convergence analysis, as illustrated in Figure 6.3.8. Without the Baloochis, there seems to be a slight convergence of the ethnic groups. This analysis makes it clear that while the aggregate ethnic grouping has improved its expenditure ratio against the dominant Persians for the period under study, the experience of individual ethnic groups may have been different. It is this analysis of individual ethnic groups that we now turn to in the next section.

6.4 Individual ethnic group inequalities

Between 1998-2010 the dominant Persian regions display a higher level of mean household expenditure over the other eight major ethnicities. For the final year of 2010, the ethnic ranking, in order of highest expenditure, is shown in appendix 4F and figure 6.4.1. Most striking of all is the low mean expenditure of the Baloochis in relation to the other ethnicities.

Figure 6.4.1 **Ethnic mean household expenditure, in Riyals 2010**

We are using an equivalence scale. These figures have been scaled for household size and should be used for comparative purposes rather than to indicate absolute mean values.

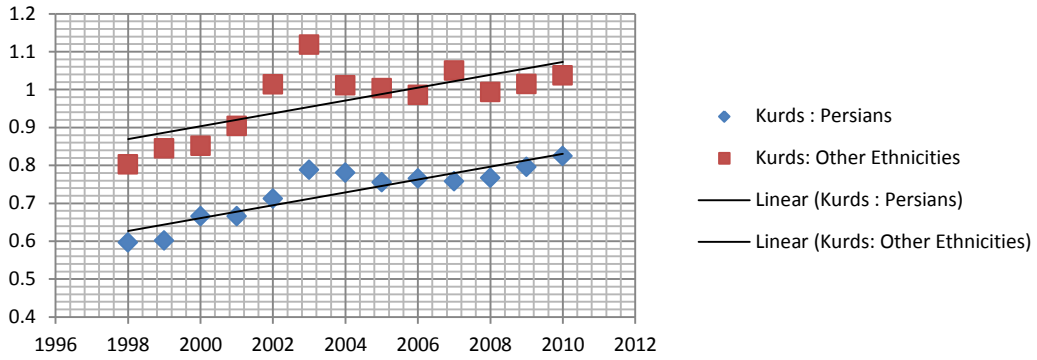


More revealing still is the trend of the evolution of mean household expenditure for the ethnicities vis a vis the Persians and other ethnicities for the period of 1998-2010. The results are presented in Appendix 4G. They reveal that most ethnic regions have improved their expenditure ratio against the dominant Persians. Notable improvements are found for

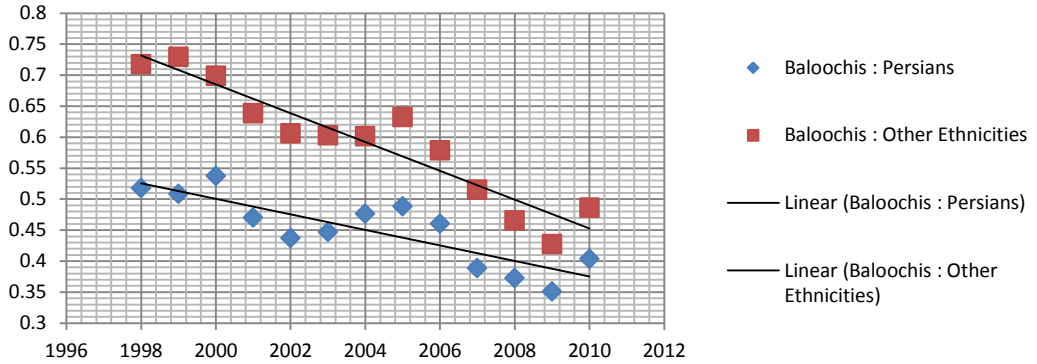
the Kurdish and Lur ethnicities. The Baloochis, however, show a worsening trend of expenditure ratio to the Persians and also to all the other ethnicities. The results are graphically presented in figure 6.4.2. Each ethnic region has fared differently.

Figure 6.4.2 Mean household expenditure ratios of ethnically dominant regions

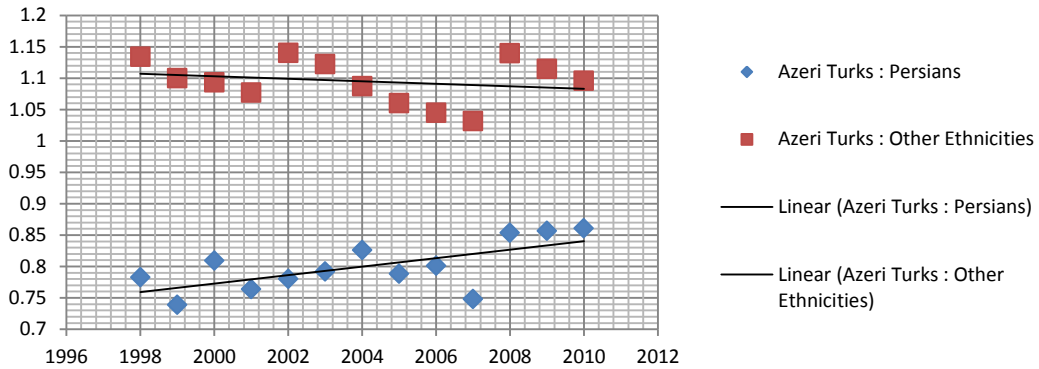
Kurds



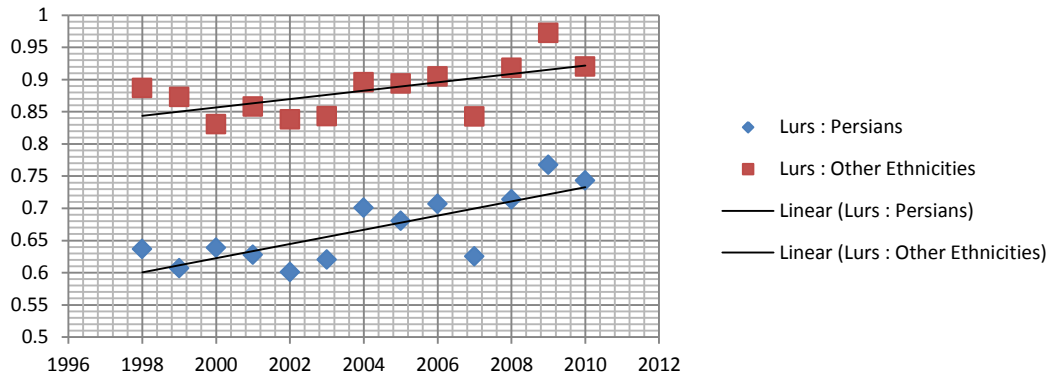
Baloochis



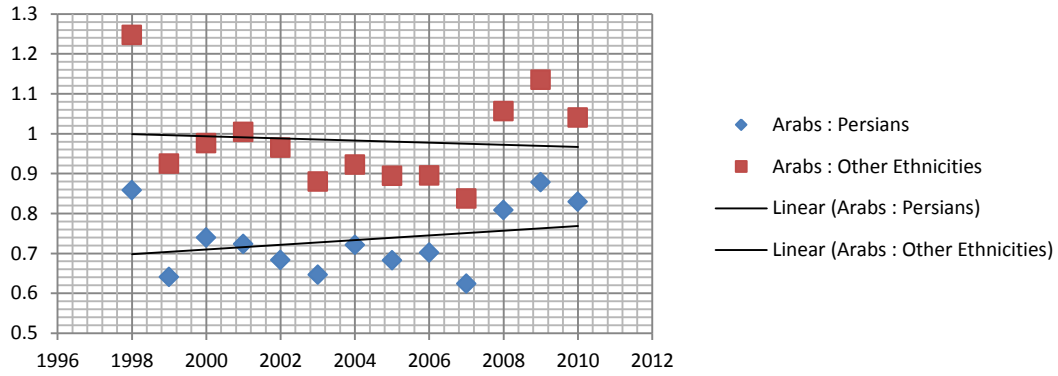
Azeri Turks



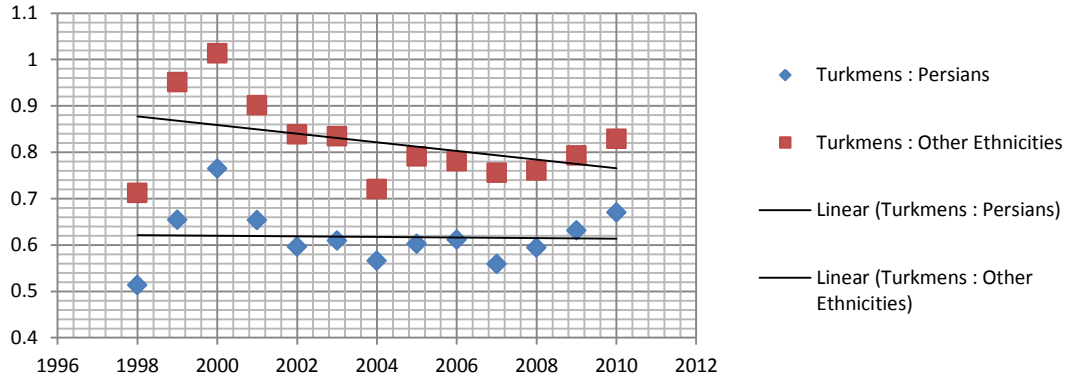
Lurs



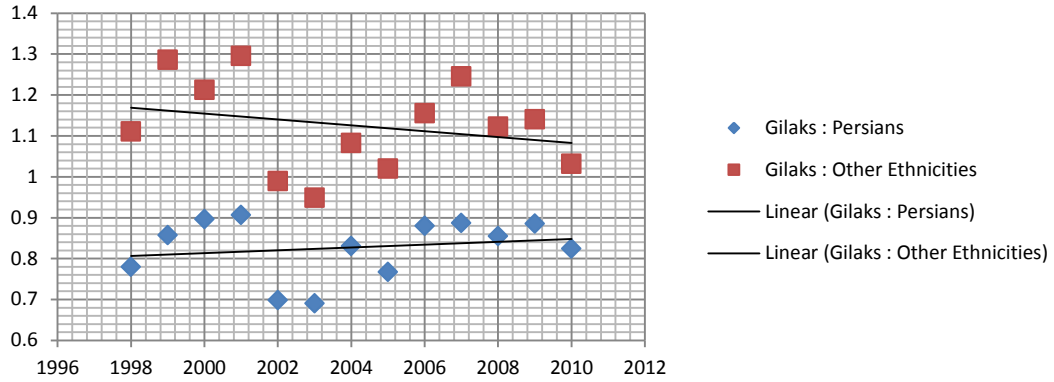
Arabs



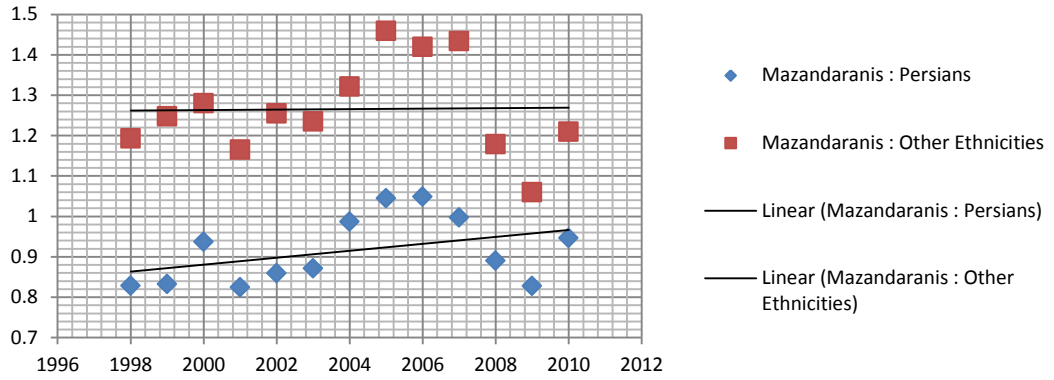
Turkmens



Gilaks



Mazandaranis



Apart from the Baloochis, all other ethnicities have either kept their relative position against the dominant Persians or improved their position.

Our findings suggest that in general ethnicity is playing a lesser role in determining the economic fortune of a household. However, the extent of this disadvantage depends on the ethnicity. In fact perhaps a more important finding is that researchers should be wary of grouping all of Iran's ethnic groups under one heading when it comes to making income inequality comparisons.

We can also conclude that it should not be assumed that a rentier state will favour the dominant ethnicity. The improving Persian : ethnic expenditure ratio is indicative of this. Indeed, in Iran's case many of the top officials are not ethnic Persians. This builds on

Robinson's assertion (2002, p.10) that when it comes to income redistributing transactions ethnicity is "just one factor that serves as a barrier to trust" referring to redistributive measures taken by the central government.

We leave it to other researchers to carry out an ethnic winners and losers analysis based on these figures as this falls outside the scope of our research. However this study does point to the need for addressing the economic needs of specific ethnic groups, as some seem to have fared considerably better than others.

6.5 Rural-urban inequality

The rural-urban divide is at the heart of the regional inequality discourse in Iran. This is why we have taken the rural/urban dimension into consideration for all the inequality analysis carried out so far. The debate surrounding urban dominance is touched upon by central-periphery discussions (Lotfi et al., 2011, Sharbatoghlie, 1991), internal migration studies (Karbasi and Fahimi-Fard, 2011, Mohtadi, 1986, Mohtadi, 1990), agricultural development literature (Majd, 1992, Haleh, 1981, Karbasi and Mojarad, 2008) and recently by new economic geography explanations (Farmanesh, 2009). Rapid rural-urban migration coupled with increased urbanization over the past four decades has made this disparity perhaps the most apparent horizontal inequality in the eyes of the general public and hence it is of particular concern to officials. It must be noted that although the population share of rural areas has fallen, in absolute terms, given the increase in Iran's population, the number of people living in rural areas has increased since 1960 and only declined slightly in absolute terms since 1991 (World Bank).[90]

The most significant pre-revolution policy attempt at tackling rural deprivation came in the form of a series of land reform legislations in 1963 termed the 'White Revolution'. Its motivation (Mahdavy, 1965) as well as its performance have been questioned. Although it met some of its objectives such as emancipating a subset of rural agricultural workers and reducing the economic and political clout of some landlords (Doroudian 1976), but it was not successful in reducing the inequality rate in Iran. It also failed to stop the decline of the agricultural sector *relative* to the booming urban service sector (Mahdavy 1970); the agricultural sector grew in absolute terms. The disengagement of the rural populace is often cited as one of the causes of the 1979 revolution (Muller and Seligson, 1987). Although the rural dimension of the revolution is disputed (Majd, 1992), nevertheless this 'rural deprivation' mandate was used by the post-revolutionary administration to initiate numerous rural development and industrialization programs in the 1980s (Sharbatoghlie, 1991).

[90] Increased from 14.6 million in 1960 to 24 million in 1991. In 2011 it stood at 23.1 million.

Significantly in order to avoid the customary problem of these programs fizzling out and being neglected by government ministries and sectoral policies, special organizations outside the government bureaucracy were setup to administer them. Significant among these were 'Jahad-e Sazandegi' (The construction crusade) which focused on infrastructure and medical services in rural areas and the 'Bonyad-e Maskan' (Housing Foundation). The failure of these policies to mitigate rural-urban inequality and cease the migration flows to urban centres, have been blamed partially on the Iran-Iraq war (1980-1988) and lower oil revenues in the 1980s (Mojtahed and Esfahani, 1989). However, the continuing inequality and urban migration trends in the 1990s (Karbasi and Fahimi-Fard, 2011)[91] indicate that the urban areas have simply overwhelmed rural areas in terms of economic activity. Notably, this migration wave, and indeed the efforts to mitigate it had already started before the revolution (Weinbaum, 1977) and cannot be solely attributed to low oil revenues or the Iran-Iraq war. Indeed, rentier theory suggests that oil rents would increase rural to urban population flows and not decrease them.

The idea that oil accelerates rural-urban migration and urban agglomeration is confirmed by Karl (2004) who finds that oil dominated economies experience one of the highest rates of urban to rural migration:

"So rapid is the outflow from the country side that some landlords, most notably those in Iran, have been compelled to import foreign workers to till their lands. This especially rapid rural-to urban migration means that cities are filled with a relatively small middle and professional class when compared to the vast majority of under-skilled and underemployed workers" (Karl, 2004, p.13).

The inequality effect of migration from rural areas to urban ones in Iran, depends on whether rural migrants are from the top or bottom of the income distribution. This is

[91] Karbasi and Fahimi-Fard's (2011) article is concerned more with an empirical cause of the migration, but they reproduce FAO data showing the extent of such migration.

confirmed by Mohtadi (1986) who finds a duel effect in income inequality from rural migration, i.e. the rural rich improving inequality and the rural poor migrants worsening it.

Despite the recognition of a significant urban-rural divide, it is surprising that little quantitative research has been published on this inequality beyond comparison of the headline figures. In this study we have attempted to consider and publish the urban/rural dimension of each piece of research carried out so far. In this section, however we wish to go a step further and explicitly compare the horizontal inequality between these two sectors in terms of mean expenditure and income distribution evolution. The methodology adopted is in parts adopted from a study by Stewart, Brown et al. (2009) measuring inequality between black and white South Africans.

6.5.1 Comparison of urban and rural mean expenditures

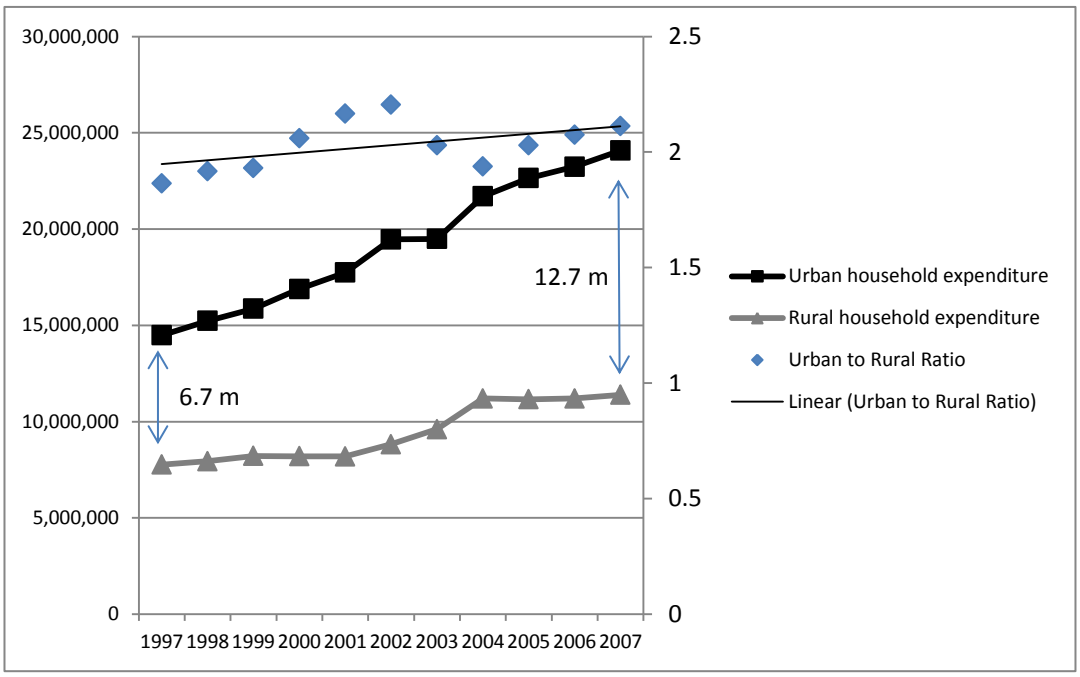
Household expenditures within urban and rural sectors in Iran have different characteristics. To account for these differences we have adopted the following methodology in making our comparison:

1. We have made use of our equivalence scale (see chapter three) for each household in the sample to account for the higher number of individuals (especially children) in urban households.
2. We have used different weights in the equivalence scales for urban and rural households to account for the higher portion of food expenditure in rural households
3. Crucially, for a time series comparison, we have used a separate urban and rural CPI to arrive at 2004 constant prices for the expenditure data as these two sectors experience distinct inflation rates. The source for the CPI figures are the Central Bank of Iran the Statistical Centre of Iran.[92]

[92] The rural CPI figures have been combined from two tables relating to two overlapping periods. The headline inflation rate often quoted for Iran as a whole is the urban inflation rate provided by the Central Bank of Iran.

Figure 6.5.1 Urban and rural household expenditures 1997-2007

In constant 2004 Riyals, equivalence scale[93]



A separate urban and rural CPI has been used to prepare the data. The table relating to this chart has been provided in appendix 6H.

As can be seen from figure 6.5.1 the rural/urban divide has steadily increased in absolute and relative terms during this period. In absolute terms, the difference between mean urban and rural household expenditure (accounting for inflation) increased from 6.7 million Riyals to 12.7 million Riyals[94] (in constant 2004 prices), an increase of nearly 90%. It is interesting to note that despite the numerous enacted rural development measures, this household expenditure divide continues to grow and could be an explanatory factor for the constant increasing population share of the urban sector.

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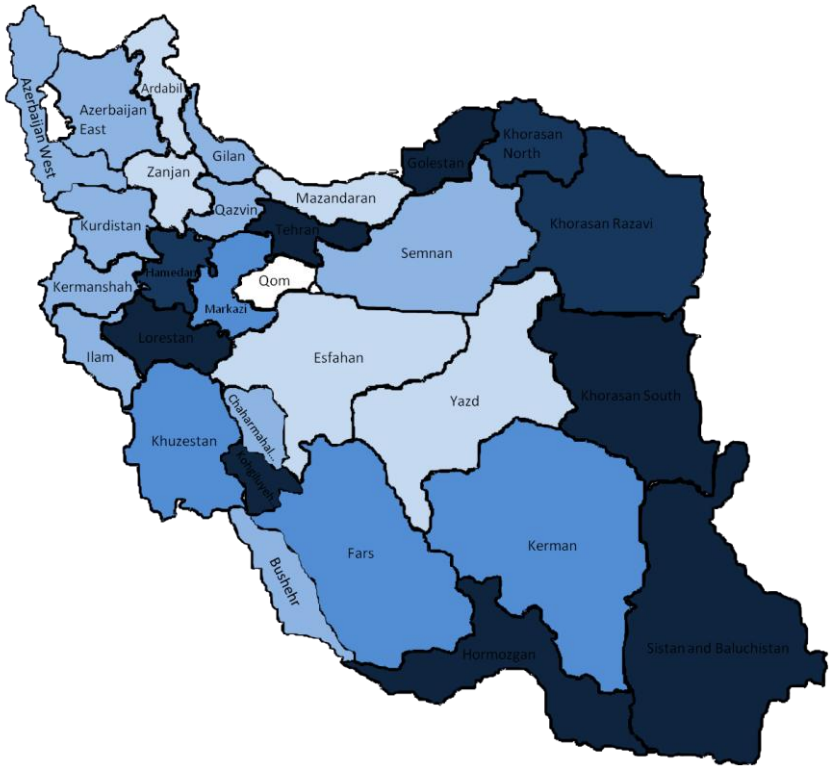
[93] The reason the analysis is only carried out up to 2007 rather than 2010, is due to rural CPI figures only being available until 2007 at the time of publication.

[94] Please note that these figures have been scaled down according to separate urban and rural equivalence scales and should not be quoted as absolute differences.

6.5.2 Geographic manifestation of the urban/rural divide

The large urban and rural disparity does not manifest itself in a uniform fashion geographically. There are wide variations between the provinces. The poorest and richest provinces, Sistan Baluchistan and Tehran, both have a large urban/rural divide. But Tehran's neighbouring province of Qom, or the central provinces of Esfahan and Yazd have a much lower urban to rural ratio. This provincial variety in the urban/rural divide provides policy makers and researchers with an opportunity of identifying the factors which augment this disparity.

Figure 6.5.2 Urban : Rural mean household expenditure ratio by province, 2010



Index - Mean urban to rural household expenditure ratio

	0-1.4
	1.4-1.6
	1.6-1.8
	1.8-2
	2-2.2
	2.2+

6.5.3 Comparison of rural and urban inequality along their distribution

Although we have compared rural/urban mean household expenditures, this does not tell the story of how these two sectors compare at different points along their income distribution. The insight into inter-distribution variations is crucial in economic and political policy formation for addressing inequalities (Stewart et al., 2009, p.7). Apart from the political implications, in order to harness effective economic remedies, policy makers need to know

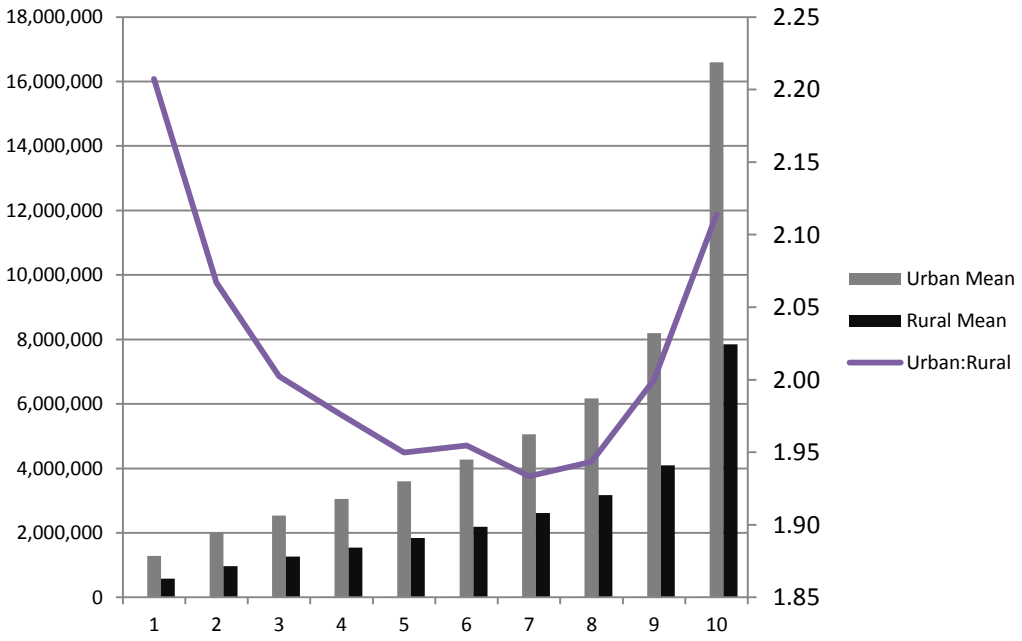
whether this rural/urban divide is more apparent between the rich, the poor, or along the whole distribution. They also wish to know how this relationship is evolving over time.

Mean decile comparison

In order to make such inter-distribution comparisons, the weighted mean expenditure of each urban decile is derived and compared to the rural one. To see how this relationship has evolved over time, the analysis is carried out for three intermittent years for the period under study 1997, 2003 and 2010 and the results are presented in Figures 6.5.3, 6.5.4 and 6.5.5 respectively.

In 1997, the decile range of urban:rural mean ratios is from 1.93 to 2.21. This is not a very wide variation but a significant one given its distinct U shape. The urban/rural discrepancy seems to be highest between the poorest and richest groups. The very poor and the very rich deciles in the rural sector, are the most disadvantaged relative to their counterpart deciles in urban areas.

Figure 6.5.3 Urban : Rural mean household expenditure ratio by decile, 1997



This fits well with our finding in chapter four, that on average the population shift from the rural to the urban sector is most likely dominated by the richest and poorest rural households. This U shape merits further research to identify the determinants behind such a pattern of inequality. However, the descriptive explanation for the enhanced disparities at the poles of the distribution, which fits well with rentier theory's prediction of urban bias, is that the urban rich are disproportionately rich and the rural poor are disproportionately poor. The middle classes are bunched closer together.

Figure 6.5.4 Urban : Rural mean household expenditure ratio by decile, 2003

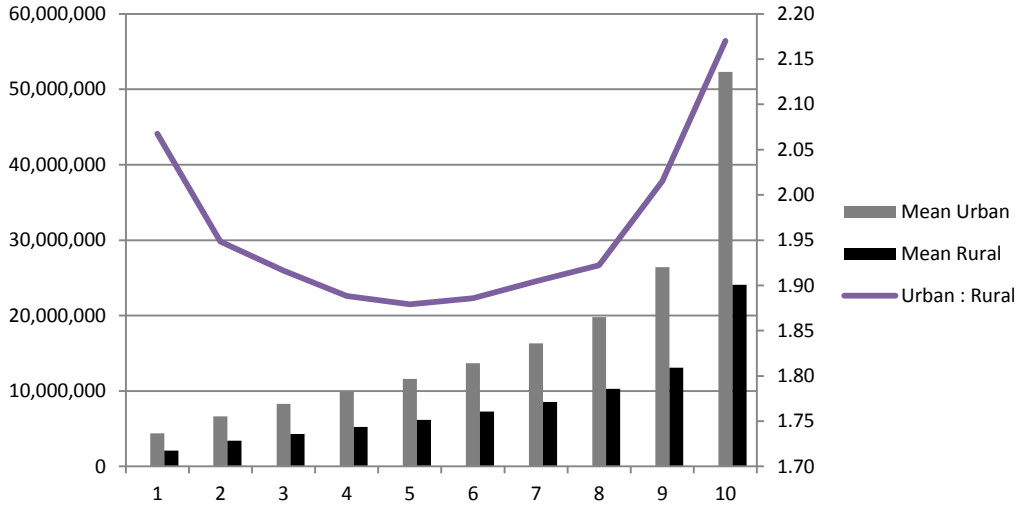
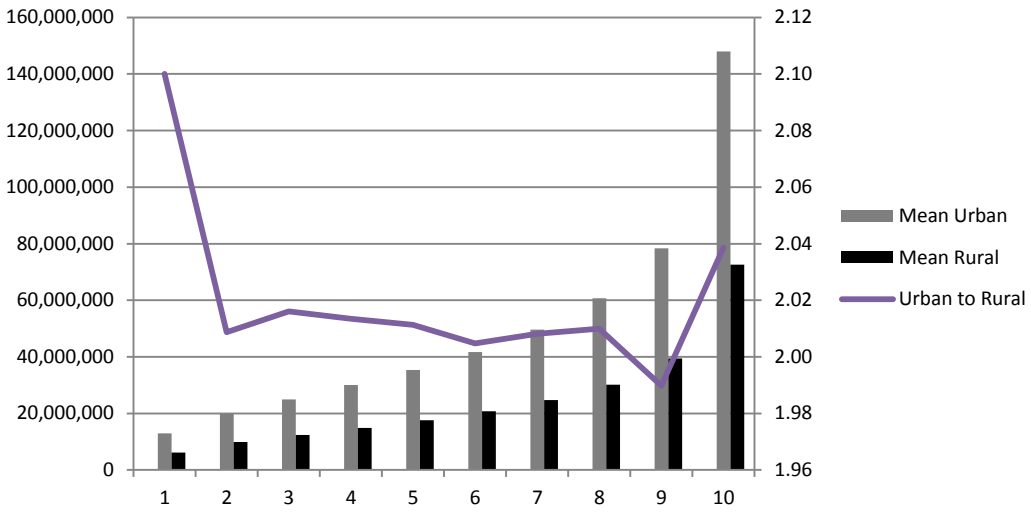


Figure 6.5.5 Urban : Rural mean household expenditure ratio by decile, 2010


160,000,000
140,000,000
120,000,000
100,000,000
80,000,000
60,000,000
40,000,000
20,000,000
0
2.12
2.10
2.08
2.06
2.04
2.02
2.00
1.98
1.96
1
2
3
4
5
6
7
8
9
10
Mean Urban
Mean Rural
Urban to Rural

In 2003, there is a similar range of inequality with the same distinct U shaped relationship. By 2010, however the bottom scale of the inequality range has shifted to a higher level of 1.99 but the upper level of the range has shifted down to 2.10. This indicates a worsening of the whole distribution but is also characteristic of a less distinct U shape. The richer group in the rural sector is not as disadvantaged as in 1997 or 2003 in relative terms. But of all the rural sector deciles, the poorest one exhibits the biggest discrepancy to its urban counterpart.

This supports and adds to our earlier finding in chapter four that following the real mean household expenditure decrease from 2008, it is the richest households which have borne the brunt in relative terms. It further shows that it is the urban rich who have been affected more than the rural rich.

6.5.4 Urban to rural alpha means comparison

Clearly whereas between 1997 and 2003 the U shape inequality has prevailed, by 2010 there seems to have been a shift in terms of the inter-distribution discrepancy. To analyse this further we use a "general means" methodology based on alpha (α) parametric means (Foster and Székely, 2001) for the urban and rural sector. Essentially rather than comparing rural and urban household expenditures along 10 points (the deciles) in the distribution, with the use of α means we are comparing the whole distribution but giving a different weight to various portions of the distribution by setting a value for the parameter α.

Foster and Székely (2001, p.11) present their parametric "general means" in the following equation:

$u_\alpha(x) = [(x_1^\alpha + \ldots + x_n^\alpha)/n]^{1/\alpha}$ for $\alpha \neq 0$

$u_\alpha(x) = \left(x_1 \ \ldots x_n\right)^{1/n}$ for $\alpha = 0$

When $\alpha = 1$ the general means becomes the standard mean, for $\alpha = 0$ it represents the geometric mean and for $\alpha = -1$ the harmonic mean. For the purposes of this study, for

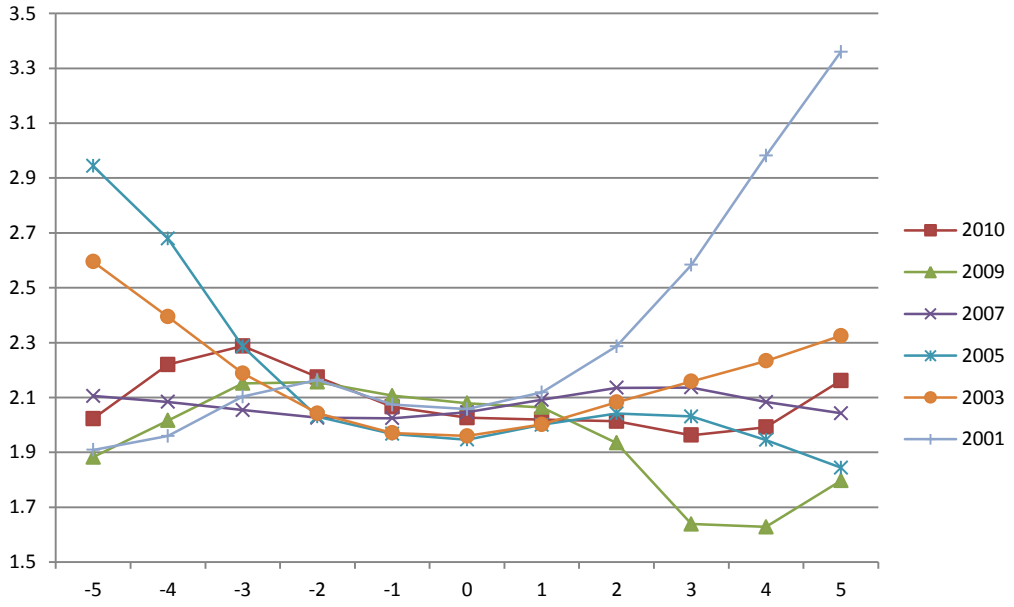
values of $\alpha > 1$ more weight is given to the households with higher expenditures and conversely for values of $\alpha < 1$.

Our methodology:

1. We calculated the 'general means' for the years of 2001, 2003, 2005, 2007, 2009 and 2010 for the urban and rural sector respectively.
2. For each year the value of alpha (α) was set from -5 to 5 respectively (in increments of 1, a total of eleven alpha values).
3. The ratio of urban to rural expenditure was then calculated for each alpha (α) value.

This methodology allows us to see the evolution of urban to rural disparity in Iran for the various points of the distribution between 2001 and 2010. The full set of results is presented in appendix 6I. Figure 6.5.6 is a succinct representation of the findings. It confirms the U shape finding of the decile ratio analysis and it also confirms that the U shape has become less distinct towards the end of the period under study.

Figure 6.5.6 Urban to rural parametric general means ratio, 2001-2010



In 2001, the most discrepancy is found when the urban:rural ratio is weighted towards the higher expenditure households. In 2003, the U shape is slightly flattened, but the poorer and richer households still produce higher urban:rural ratios. By 2005 the richer households do not display any higher discrepancy than other parts of the distribution. By 2007 and 2008, the U shape relationship is reduced further, apart for lower income households. By 2010, however, the U shape inequality between the two distributions seems to be appearing again.

In conclusion to this section, the gap and ratio of urban to rural expenditures has increased for the period under study. Geographically, there are wide variations between the provinces hinting at localized determinants for much of this underlying horizontal inequality. The respective poorest and richest groups of the two sectors display the largest discrepancy in expenditures, hinting at a 'disproportionately' rich urban elite and a very disadvantaged rural group at the bottom of the rural distribution. In effect the U shape of the distribution comparison between the two sectors highlights a polarized inequality beyond the already wide inequality gap indicated by the annual mean measurements. The alpha means analysis suggests an improvement of this polarization in recent years, but the 2010 figures suggest a possible return to the U shape.

6.6 Public to private sector household inequality

Iran is a resource rich country, where oil and hence direct government expenditures dominate the economy. Many groups and sectors can be losers and winners in such a rentier economy (Mahdavy, 1970). The focus of this section is on public wage earners v private wage earners as this data is readily available and it relates directly to the rentier economy theory for resource rich states.

Public / private sector inequality is of particular interest in Iran, as rentier states do not have a strong fiscal system (Luciani, 1987) and government expenditure takes centre stage in redistribution policies. Between 1997 and 2009[95] the average contribution of direct taxation (taxes on income, profits and capital gains[96]) to government revenue was only 13.7%. For the same period, the average contribution of total tax revenue (including tariffs) to Iran's GDP was just 7.6%. This weak fiscal base greatly accentuates the income inequality effects of government expenditure, a major component of which is public sector employment. We therefore deduce that public sector wages should have a significant impact on inequality in Iran if there is a high level of horizontal inequality between public and private sector wage earners.

It is perhaps telling that when Mahdavy (1970) briefly addresses income inequality in his pioneering article on the rentier state, his focus is on public and private wage differentials. Similarly Behdad (1989, p.330) speculates there should have been improvements in income inequality in the immediate years following the 1979 revolution by focusing on the role of public sector wages, noting that, "Between 1977 and 1980, real wage and salary payments per worker in "large" manufacturing establishments (with 50 or more workers) increased 43.4 percent (64.2 percent for blue-collar workers). During this same period, employment in these establishments increased 14.2 percent, in spite of a 19.3 percent decline in real output."

[95] No figures were available for 2010 from the World Bank at time of publication.
[96] Source: World Bank, "Taxes on individuals, on the profits of corporations and enterprises, and on capital gains, whether realized or not, on land, securities, taxes on income, profits and capital gains"

While a finding that the public sector mitigates income differentials, its reliance on government revenues makes it vulnerable to oil shocks in a rentier state (Karl, 2004), and such a finding should therefore not be interpreted as a 'policy tool' for reducing inequality. However, it does provide clues as to the effect of future privatization programs (as stipulated in Iran's fourth 5 year economic development plan 2005-2010) on inequality.

In this section, we wish to measure the level, pattern and evolution of public/private sector horizontal inequality for the period 1997-2010. In particular we wish to investigate whether such an inequality is in existence, what pattern it takes, whether it is becoming more prominent and as with previous analysis consider its rural/urban dimensions.

6.6.1 Methodology

As before, we are utilizing household equivalence expenditure data in this analysis. A few points relating to our methodology should be noted:

1. The head of the household is assessed as being a public sector wage earner, a private wage earner or other (which includes self-employment, cooperative workers, unemployed, joint private and public sector workers). The classification of the whole expenditure data for the household is determinant upon the head of the household[97]. There are methodological complications in determining who should be considered as the head of a household. (Beaman and Dillon, 2009). We have simply chosen the individual identified as household head by the Statistical Centre of Iran.
2. The reason 'self-employment and entrepreneurial' jobs are not included in our inequality analysis is that in many cases they overlap and are in addition to public and private wage earnings. Our inequality analysis is therefore between household

[97] There are a very small number of household heads who are listed both in the private and public sector. This could be due to them working in both simultaneously or moving from one to the other within the period of the same year. These households are very few in number and have been included in both groups for the urban public to private sector time series comparison. However, they have been put in the 'other' category when it comes to GINI comparisons, decile comparisons, household population shares etc.

heads who are exclusively either private sector wage earners OR public sector wage earners.

3. The line between private and public companies in Iran can be blurred. This is due to the recent privatization programs and the ownerships of many companies by semi-official organizations (Bjorvatn and Selvik, 2008). We have accepted the public/private classification provided by the Statistical Centre of Iran. Those in the 'cooperative' sector have been put in the 'other' category.
4. As we are solely considering the employment sector of the household head, but measuring the expenditure of the whole household. Therefore in some cases we are classifying a household as a public sector household when it may have secondary private sector income through another household member (and vice versa).
5. By looking at household expenditures rather than monetary income as a proxy for wage earnings we are accounting for non-salary perks which wage earners may receive, especially public sector workers.

6.6.2 Public and private wage earner inequality in urban areas

Expenditures of households with a public or private wage earner at the head were compared. Equivalence expenditure is used to account for different household sizes. The urban CPI has been used to deflate the time series data, at 2004 constant prices. The full results are provided in appendix 6J.

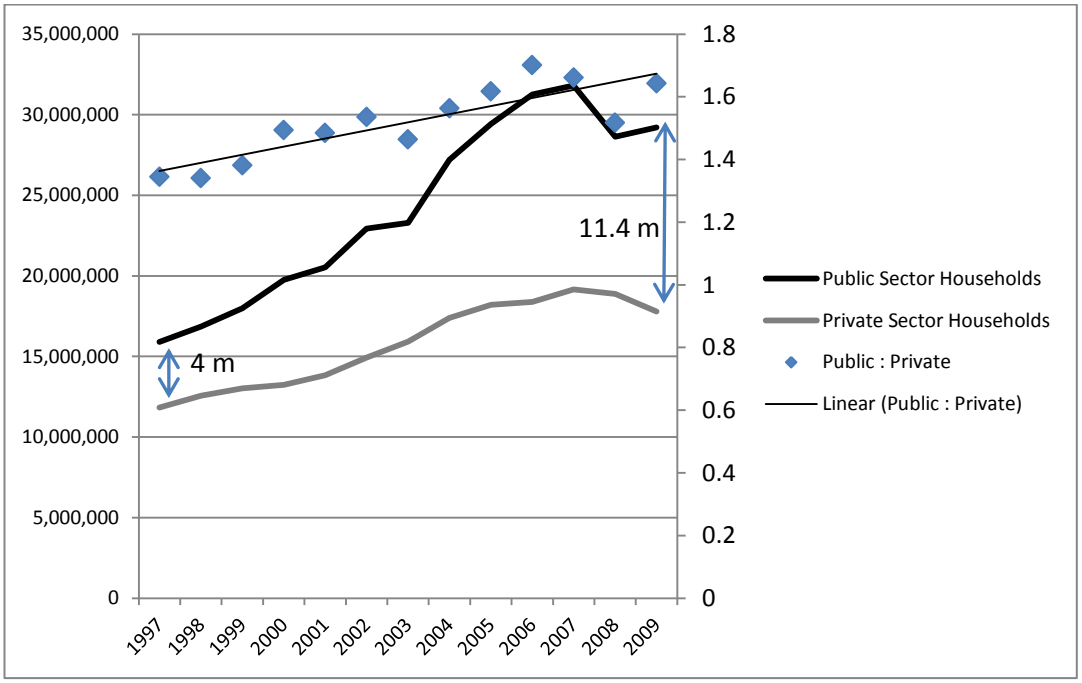
Figure 6.6.1 shows that there is a significant gap between public and private sector household expenditures. This gap has been increasing in both real terms and proportionally for the period under study. The expenditure gap in real terms has increased from 4 million Riyals (in 2004 constant prices) in 1997 to over 11 million Riyals[98] in 2009. Furthermore the

[98] Please note that these expenditures have been scaled down for household size and makeup. Rural and urban households have different scales.

ratio of public to private sector household expenditures has increased steadily from 1.3 in 1997 to 1.6 by 2009. By 2010, (in 2010 nominal prices), there is almost a 30 million Riyals gap between annual public and private household expenditures, and the ratio of expenditures is 1.7.

Figure 6.6.1 Public & private sector urban household expenditure, urban 1997-2009

Expenditures deflated by urban CPI to constant 2004 Riyals. Equivalence expenditures have been used.

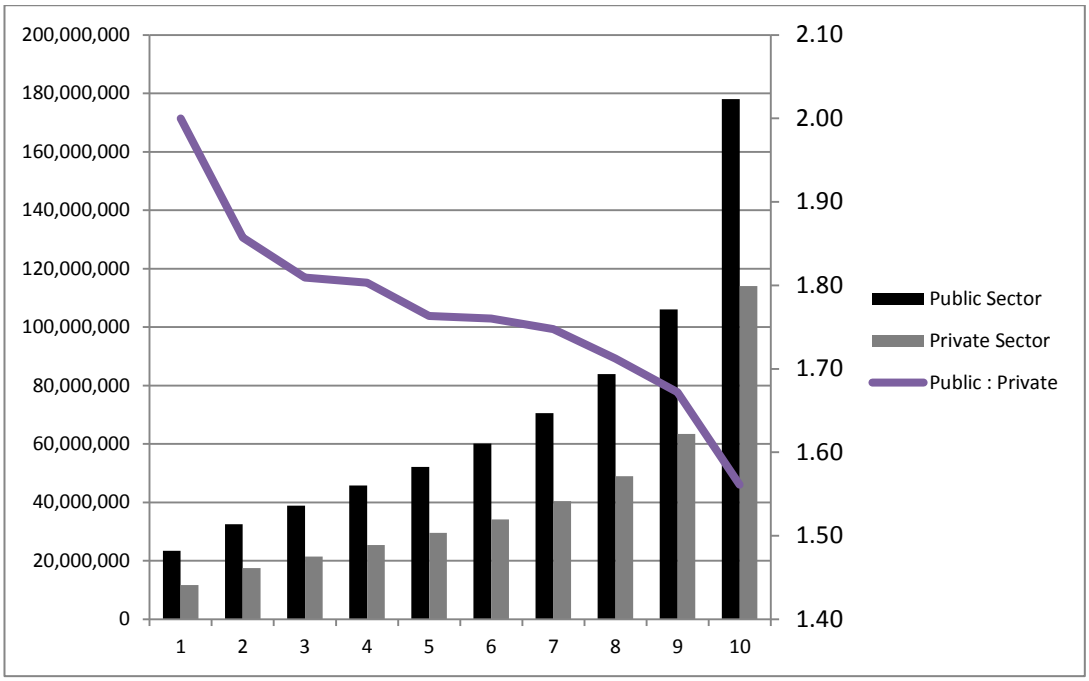


6.6.3 Decile comparison of public and private sector households

A comparison of the distribution of public and private sector headed households reveals that it is the poorest households which are experiencing the biggest horizontal inequality. Remarkably and without exception, for every consecutive poorer decile the mean expenditure ratio of public to private sector increases. This hints at a more equal distribution of expenditures within the public sector v the private sector which we investigate in the next section.

Figure 6.6.2 Urban public : private sector households mean decile expenditure, 2010

Expenditure in 2010 Riyals.



6.6.4 Intra inequality within private and public sector households

As well as having a higher mean expenditure, households headed by a public sector wage earner, also display a lower inequality. The findings show that by 2009, the GINI for public sector households is 0.33 as opposed to 0.36 for private sector households. Clearly the public sector is having a vertical inequality reducing effect in terms of its own workers but a

horizontal inequality augmenting effect in terms of its wage differentials with the private sector.

6.6.5 Rural / urban dimensions of public/private sector inequality

Table 6.6.1 Urban and rural household expenditure, by public & private sector 2010

In 2010 Riyals

2010, mean expenditure	Public Sector	Private Sector	Other	Public : Private
Urban	69,184,432	40,638,508	51,026,445	1.7
Rural	43,660,051	21,439,887	25,407,890	2.04
Urban : Rural	1.6	1.9	2.0	

The ratio of public sector household expenditures to private ones is even more pronounced in rural areas. For 2010, the expenditure of public sector headed households is 2.04, more than double that of private sector headed households. This has increased from a ratio of 1.64 in 1997. Similar to urban households, the public/private sector discrepancy has risen both in real terms and proportionally for the period under study. Public sector households in urban areas also show less discrepancy with their counterparts in the rural sector compared to private sector headed households. An expenditure ratio of 1.6 for the public sector compared to 1.9 for the private sector.

More revealing still is the very low representation of public sector headed households in rural areas by 2010. As table 6.6.2 shows only 11% of them are in rural areas as opposed to the 89% in the urban sector. This figure would be expected to be closer to the 27% which represents the rural household population for 2010. This finding clearly highlights that the public sector is very much biased towards urban areas.

Table 6.6.2 also reveals the relatively lower inequality among all (urban and rural) public sector households as opposed to private headed ones. The GINI for the 'Other'

category is understandably very high as it includes every other type of household, such as unemployed, self-employed, cooperative workers or a combination of publicly and privately headed household.

Table 6.6.2 Proportion of public and private sector headed households, 2010

	Urban	Rural	GINI
Public Sector	89%	11%	0.33
Private Sector	71%	29%	0.38
Other	72%	28%	0.42

6.6.6 The drop in public sector headed households

The figures reveal that both the urban and rural sectors have witnessed a fall in exclusively public sector headed households.

Table 6.6.3 Share of urban households by job type of the household head

Year	Public Sector	Private Sector	Other*
1997	25%	23%	52%
2003	19%	27%	54%
2010	12%	29%	58%

*Other includes any household which is not exclusively headed by a job in the public or private sector. This includes the unemployed, freelance, mix of public and private etc.

Table 6.6.4 Share of rural households by job type of the household head

Year	Public Sector	Private Sector	Other
1997	12%	30%	59%
2010	4%	34%	62%

For urban areas we compare the years of 1997, 2003 and 2010. There has been a steady fall from 25% in 1997 of all urban household heads working exclusively in the public sector to 12% in 2010. This cannot be solely related to the urban sector's rising share of the

population during this period as a similar drop can be seen in the rural sector, a drop from 12% in 1997 to 4% in 2010. The proportion of private sector and freelance jobs has increased during this period.

To conclude our findings in this section, we have found a growing expenditure gap between the private sector and public sector headed households. This horizontal inequality is more pronounced the poorer the household. In the rural areas the gap is even wider. Public sector headed households are better off, have less inequality between themselves, and are becoming more exclusive, with only 12% of urban households now being headed exclusively by a public sector worker.

6.7 Concluding remarks

In this chapter we reported our findings on four horizontal inequalities relating to Iran:

1. **Intra-provincial inequality comparisons**

   We found a very wide spread of inequality within the provinces. This did not seem related to the level of expenditure of the province and can partially be explained by the degree of the rural/urban divide within the province. There was some evidence of similarly ranked urban areas (in terms of within inequality) being clustered geographically. For rural areas this pattern did not exist, and a picture of a disintegrated rural sector emerged.

2. **Ethnic inequalities**

   The household expenditure gap between Persian and non-Persian regions seems to be falling. This gap only seems to exist between the urban areas. Ethnic regions are no more homogenous in terms of inequality than Persian ones. We provided a ranking and a convergence/divergence analysis of ethnic regions in relation to the dominant Persians and all other non-Persian ethnicities combined. The performance

of the various ethnic regions differs during this period. Whether this is strictly due to the ethnicity of the region or completely unrelated factors deserves further research.

3. The rural urban divide

   The gap in real terms between urban and rural households is constantly increasing. The biggest difference is between the poles of the two distributions, i.e. the rich urban v rich rural and the poor urban v the poor rural.

4. Public v private sector households

   Exclusively public sector headed households have been shrinking as a proportion of total households. However, their privileged position in terms of household expenditure has increased significantly in real terms from 1997 to 2009. Public sector households have a decreasing vertical inequality effect as they have a lower GINI than private households, but an increasing horizontal inequality effect as there is a large and growing expenditure gap between them and other households. The poorer the household the bigger the relative gap between the private and public sector. The relative gap is also larger in rural areas.

The ‘intra-provincial’, ‘urban/rural’’ and public/private sector’ findings are in keeping with our rentier inequality predictions, with the proviso that many of these patterns may also be apparent in non-rentier states. However, the expenditure convergence trend of ethnic with Persian dominated regions is perhaps a signal that the distribution of oil rents does not necessarily have a strong ethnic determination, or if it does, this is mitigated when the ruling administration is itself composed of mixed ethnicities. We should note that there is a notable exception in the ethnic convergence analysis, the Baloochis, whose plight has significantly worsened in relative terms during the 1997-2009 period.

7. Asset Index

7.1 Introduction

In this chapter we create an urban and a rural wealth asset index for Iran to allow future researchers to have a simple to measure wealth variable for inequality studies. The micro household expenditure analysis carried out in the previous chapters provides an invaluable opportunity for calibrating such a wealth index. A wealth index can be of particular value for studying a rentier state which is prone to macroeconomic shocks that lead to fluctuations in household money metric data, obscuring more long-term underlying inequality patterns.

The income inequality analysis carried out in the previous chapters has relied first and foremost on household expenditure data. It is apparent that this approach has numerous benefits such as accommodating decomposition analysis and giving rise to widely cited headline inequality measures. Expenditure itself is also a readily understood tangible concept and easy to interpret. Nevertheless, this approach is by no means comprehensive, nor always the best option.

Another recent and increasingly common methodology for measuring income inequality is through the use of an asset index. The pros and cons of this approach will be discussed later in this chapter, but two benefits should be noted at the outset. The first, which relates directly to Iran is that, as demonstrated in chapter four, oil price windfalls inevitably lead to fluctuations in direct government expenditure which impact household inequality expenditures. While, in most instances, we may wish to capture this fluctuation, there are times when it may be more suitable to use an inequality measure which is more likely to reflect an ‘underlying inequality’ less prone to temporary fluctuations. This could be the case when looking at the effects of inequality on health or education indicators for example. Unlike expenditures, durable assets are reflective of accumulated wealth rather than a proxy for income and are less prone to short term variations (Rutstein et al., 2004).

The second advantage of an asset index is a practical one. It is very simple and cheap to collect asset data. As acknowledged in chapter 3, collecting expenditure data is a complicated and intricate procedure involving hundreds of questions, all of which can be adversely affected by recall issues. It is beyond the capabilities and resources of most surveyors to carry out an expenditure survey alongside their own survey. Finding out if a household has a selection of assets, on the other hand, is a procedure which can be carried out in a matter of minutes by an individual field researcher. This means that surveys on education, health, gender, employment etc. can be coupled with a simple asset questionnaire so that the resulting indicators can be associated with a 'wealth index'.

Given the paucity of published research specifically addressing inequality in Iran, we did not come across any asset indices for Iran. Given the importance accorded to this methodology in recent literature, it was therefore deemed beneficial for the purposes of this and future research to create an asset index for Iran. This wealth index can be used not only in measuring the effects of wealth but also as a control variable for indicators highly correlated with household wealth. The household expenditure data analysis carried out in the previous chapters also presented us with an invaluable dataset for calibrating the asset mix which shapes the index.

7.2 Why an asset index?

There are a number of recognized shortfalls in taking a money metric approach (utilizing income and expenditure data) in estimating income inequality (McKenzie, 2005, Moser and Felton, 2007, Prakongsai, 2006, Rutstein et al., 2004, Sahn and Stifel, 2003). We have categorized the shortfalls which pertain to Iran's income and expenditure data under the three headings of volatility, accuracy and practicality.

Volatility

1. Like many other developing countries, Iran has an informal labour market where incomes are volatile. Many in the informal sector may also engage in barter and other non-monetary trade. Expenditure data has the effect of 'smoothing out' this volatility and captures non-monetary trade to some extent, but not as much a wealth index would.
2. The number of small family businesses in Iran has substantially increased since the 1979 revolution (Nomani and Behdad, 2006). The income from such businesses can be irregular and uneven during the year.
3. Income, especially in Iran's rural sector, can be seasonal. Again expenditure data would smooth this out to some degree but would be subject to more fluctuations than asset data.
4. Regular oil price fluctuations would exhibit themselves on income and expenditure data more than on an asset index.

Accuracy

1. Asset data provided during a survey is not subject to the same recall and measurement problems which plague expenditure and income surveys.
2. Expenditures are usually made by all individuals in the household, whereas the expenditure household survey is usually carried out with one individual household member who may not recall or be privy to expenditures of other individuals. Assets on the other hand are 'visible' and difficult to forget.
3. Work done to increase wealth directly, such as house improvement, or other asset augmenting work may not be reflected in expenditure or income data.
4. Asset data may offer a better understanding of a household's long term (more permanent) standard of living rather than annual expenditure or income data.

5. When it comes to cross country inequality comparisons based on expenditure data, Purchasing Power Parities (PPP) are error prone (Sahn and Stifel, 2003).
6. Expenditure and income data tend to be of a lower quality for regions which are poorer (Prakongsai, 2006).

Practicality

1. An asset data questionnaire can often be completed by just one household respondent in a few minutes.
2. Asset data are less prone to interviewer or reporting bias. Their 'physicality' makes them easily verifiable and less open to subjective interpretation.
3. As highlighted in chapter 3, provinces in Iran may be subject to different consumer price indexes and even if this data can be obtained, it makes inequality analysis very complex. Rural, regional and seasonal price differences all have a negative impact on the accuracy of inequality analysis. However, asset data across different provinces are more easily comparable, with the caveat that the quality of assets may significantly differ.

7.3 Asset index shortfalls

Despite numerous positives, an asset index should strictly be seen as a complimentary methodology to money metric income inequality analysis, appropriate for certain circumstances. As noted, an asset index is an indicator of long term wealth and does not capture short term fluctuations and should not be used for researching outcomes related to current resources available to households (Vyas and Kumaranayake, 2006). By not being a money metric measure, it is not cardinal in nature and does not give rise to the easily understood inequality measures such as the GINI coefficient. Whereas as money metric approaches are the same for all groups across a time dimension, the ideal asset mix to derive a wealth index may differ by sector, geographically, by gender, across time, etc.

Asset questionnaires for rural and urban households are often the same (as is the case with our asset data) despite the often differing asset mix of rural and urban households.

In many cases (such as in this case), asset data has not been collected for the purposes of forming an asset index and thus suffers from a number of shortfalls, including the exclusion of assets which may be exclusive to the rich such as the possession of a holiday home, extra cars and the latest technological gadgets (Moser, 1998). Additionally, asset information does not often contain wealth distinguishing information regarding the quality of particular assets, for example there are many types of colour televisions, many models of cars (Falkingham and Namazie, 2001).

Finally, an asset index is a purely relative measure and does not allow for absolute comparisons which may be necessary for certain analysis, such as the measurement of poverty. For the purposes of this research into income inequality this is not an issue.

7.4 Creating an asset index

Arriving at a wealth index inevitably involves the aggregation of a mix of assets in some manner. One way is to simply sum up all the assets. In effect each asset is being afforded the same weight. This approach benefits from simplicity but is only appropriate if all the assets have approximately the same value. Another approach is to weight the assets by their price. However, this approach suffers from the same complications and drawbacks as money metric methodologies. The recent and commonly adopted approach as put forward by Filmer and Pritchett (1998) is to use the statistical technique of Principal Component Analysis (PCA).

Principal Component Analysis

Principal Component Analysis (PCA) is a commonly used mathematical tool for deriving simple patterns from complex data. The method leads to the formation of a series of linear representations of the underlying data. It is hoped that the variance along a handful of these linear representations can be used to approximate the whole data set. For the purposes of creating an asset index, only one of these linear representations is commonly used. This is the linear relationship which explains the most data variance, termed the “first principal component”. Filmer and Pritchett (1998, p.116) pioneered the technique of PCA “to determine the weights for an index of the asset variables” by considering the first principal component of a mix of household assets.

If we assume that household wealth is the main factor influencing the variation witnessed in the asset mix of households, then PCA can be used to model this ‘wealth’ variable. Intuitively, if owning one asset is significantly correlated to owning many other assets, then this asset is given a positive weight and if it indicates having fewer assets it is given a negative weight. Assets which are not significantly correlated to other assets will have a weight close to zero. For example, a washing machine may indicate the ownership of many other assets whereas a motorbike may not.

In mathematical terms, PCA “seeks a linear combination of variables such that the maximum variance is extracted from the variables” (Prakongsai, 2006, p.7). Having removed this variation, it seeks a second linear combination explaining most of the remaining variance and so on, leading to the creation of a series of uncorrelated principal components ordered in decreasing explanatory power of the observed variation.

For a set of assets $X_1$to X_n (Vyas and Kumaranayake, 2006):

$PC_1 = a_{11}X_1 + a_{12}X_2 + \cdots + a_{1n}X_n$

$PC_2 = a_{21}X_1 + a_{22}X_2 + \cdots + a_{2n}X_n$

.

.

.

$PC_m = a_{m1}X_1 + a_{m2}X_2 + \cdots + a_{mn}X_n$

For our purposes it is the first of these components (PC_1), the one which explains the most variation and hence contains the most information common to all assets, which is used in constructing the asset index. Apart from this intuitive explanation, the first principal component is confirmed by analysis as being the PCA component of choice in approximating a measure of wealth by McKenzie (2005).

The individual factor scores derived from the first principal component are used to derive a wealth score for each household (asset index). Every factor score is normalized by its mean and standard deviation for each household (even if the household does not possess that asset). Therefore, by design the mean wealth score for all the households as a whole is zero.

The asset index derived for each household is as follows:

Reproduced from: (Filmer and Pritchett, 1998, Prakongsai, 2006):

A j = f1*(a j1-a1) / (s1)+…+ f n*(ajn - an)/ (sn)

Where

A j is the asset index for each household (j =1,……..,n)

fi is the factor for each asset (i =1,……,n)

ai is the mean of ith asset of household (i =1,……,n)

si is the standard deviation of ith asset of household (i =1,……,n)

Weaknesses of PCA based asset indexes

There are a number of criticisms of the 'family of PCA methodologies' for arriving at an asset index. For a start PCA limits itself by looking for a purely 'linear' relationship of variables to maximize variance. There are questions over its use for dealing with discrete data, the arbitrary nature of the assets selected to input into the PCA and the fact that the first principle component often explains a very small proportion of the total variance observed in the dataset (Howe et al., 2008). PCA use as an appropriate proxy for consumption expenditure is questioned.

However, as Rutstein, Johnson et al. (2004, p.10) point out "the wealth index was never meant to predict household income", it is intended as a longer-run proxy for wealth. Despite the theoretical criticisms, in practice, the PCA methodology has been found to be robust enough in acting as a proxy for wealth in studies by (Sahn and Stifel, 2003, McKenzie, 2005, Prakongsai, 2006, Vyas and Kumaranayake, 2006). Howe, Hargreaves et al.(2008, p. 1) who present many of the deficiencies of the PCA approach to creating an asset index acknowledge, "Despite the limitations of PCA, alternative methods also all had disadvantages."

Staying within the PCA family, but making improvements to the method, Kolenikov and Angeles (2004, 2009) include the use of ordinal and polychoric principle components analysis[99]. Apart from leading to a better estimation of its coefficients, the polychoric PCA allows for the use of ordinal variables, such as the quality of household construction, or the quality of the heating system within the household. The standard PCA approach (Filmer and Pritchett, 1998) deals with ordinal variables by introducing a dummy variable for each one. This inevitably leads to the introduction of unnecessary correlations into the PCA analysis.

[99] Ordinal PCA and Polychoric PCA are actually two different methodologies, but as they are both intended for dealing with ordinal and categorical variables, and both put forward by Kolenikov and Angeles (2004) and Kolenikov and Angeles (2009) they are lumped together here.

7.5 Creating an asset index for Iran

In creating the asset wealth index for Iran, in the main, we followed the methodology outlined by Filmer and Pritchett (1998). The ordinal and polychoric approach as suggested by Kolenikov and Angeles (2004) may yield more accurate results, but it was felt that given the lack of substantial ordinal data (ordering of categories) the classic PCA approach was sufficient. Future researchers may wish to adopt the Kolenikov and Angeles (2004) methodology and compare results. Perhaps, more pertinent to the final shape of the asset index is the preparation and selection of assets to be included in the final index (Howe et al., 2008), where the focus of this study lay.

7.5.1 The data

We have made use of data from the asset questionnaire which is included in the annual household income and expenditure survey for 2010[100] as carried out by the Statistical Centre of Iran (SCI)[101]. As this questionnaire is not designed for the purposes of constructing an asset index in Iran, from our perspective it suffers in three areas. If a survey was to be designed specifically for the formation of an asset index in Iran, ideally the following should be modified:

Inclusion of more assets

Assets which are not common, but may be a good indicator of a household's level of wealth in Iran have not been comprehensively included in the survey. For example the questionnaire fails to find out if a household is in possession of a dedicated dining table, a holiday home, ski equipment or a laptop (possible wealth indicators). Although it is not

[100] As far as this author is aware there are currently no exclusively designed surveys or survey sections for the purposes of constructing an asset index in Iran.

[101] Please note that the raw data did not actually have descriptive asset columns. i.e. it was not clear which asset a particular data column referred to. However, through analysis, it was ascertained that the data columns matched the order of the questions on the questionnaire form. This was confirmed by analysing the frequency of assets.

possible to include all assets in such a questionnaire, it is clear that if the purpose of the survey had been to draw up an asset index, other asset questions would have also been put forward to the households. This is backed up by the fact that two seemingly mundane durable assets, sewing machines and hoovers, which were covered by the survey actually proved to be very good indicators of wealth levels. It is acknowledged that too many questions would defeat the purpose of carrying out an asset questionnaire which is supposed to be simple in nature and easy to carry out. However, some other asset questions, which are unlikely to yield variation in the data, could be left out all together.

More in-depth information

Certain assets which are included in the survey could prove to be much better wealth indicators if more was known about them. For example if a household owns a car, is it an Iranian manufactured car or imported? How many cars does the household own? Does the TV have a flat or protruding screen? (For the year 2010, this would produce more variation than asking whether the TV is colour or black and white). These qualitative questions would help to increase the variation within the data and provide more wealth information.

Different urban and rural questionnaire

The urban and rural questionnaires were the same, despite these two groups probably possessing a broadly different asset mix. i.e. there may be assets which should be asked about in rural areas and not in urban ones, and vice versa. We mitigated this problem to some extent by creating a separate asset index for the urban and rural sectors, based on a different mix of assets selected from the list of total available assets.

The 2010 household income and expenditure survey includes a one page asset questionnaire (image of questionnaire in appendix 7A). This consists of seven sections dedicated to physical capital asset ownership. Below we explain how we processed the data from each section of the questionnaire. It should be noted at the outset that the objective of this exercise was to formulate an 'economic' asset index as opposed to a 'socio-economic' one. Only physical capital will be considered. We are not including data which relates to human capital, social capital or financial capital. This allows researchers to quickly and simply form the asset index as a proxy for long run wealth.

Section 1

The first asset question relates to how the household has taken possession of their home:

1. Freehold and leasehold
2. Leasehold
3. Rental (monthly payment)
4. Rental (fixed deposit payment)
5. In return for work
6. Without payment
7. Other - specify

In the case of option 7, 'other', we found that the overwhelming response was inheritance. Based on the options above, we created a simple dummy variable of 'Ownership'. If a user's response was number 1,2 or 7 we categorized them as owners assigning the value of '1' and anything else assigning the value of '0'.

Sections 2 and 3

These two sections deal with the number of rooms and the size of the house (in square meters) respectively. A variable for each one was created. Please note that the raw data

was not standardized, and when it came to carrying out the PCA analysis, rather than using the covariance matrix, the correlation matrix[102] was used to account for the non-standardization of the raw data.

Section 4

This section looks into the building material used in the construction of the house.

Options include:

1. Steel
2. Reinforced Concrete
3. Other
    a. Iron & brick or iron & stone
    b. Wood & brick or wood & stone
    c. Concrete blocks (with roof of any material)
    d. Brick, or stone & brick
    e. Wooden
    f. Cob & wood
    g. Cob & mud
    h. Other

In effect ten differing building materials (including other) are presented here. A dummy variable was created for each one. At first glance the above list appears to be ordinal in nature and it may be better to use the ordinal PCA approach suggested by Kolenikov and Angeles (2004). However, although the above building materials are listed in a theoretical order of quality, in practice many poorer or richer households do not choose the construction material used in their buildings of dwelling. This is specially true of urban households who live in households of multiple occupation or big blocks of flats. Indeed in practice, when

[102] The statistics package Stata gives the option of using the co-variance or correlation matrix when running a PCA.

individual household construction variables were tested against household expenditure rankings, many of them displayed no particular relation to household expenditure levels. One or two of the construction material were also very rarely reported in the survey. Nevertheless, taking this commonly practiced dummy variable approach for orindal data, as suggested by Filmer and Pritchett (1998), inadverdently introduces a set of variables into the PCA which are perfectly negatively correlated with eachother.

Section 5

This section inquires into the ownership of over 20 durable assets such a car, a TV, fridge etc. A dummy variable was created for each one.

Section 6

This section focusses on the ownership of utility based assets such as an air conditioning unit, a telephone, an internet connection etc. A dummy variable was again created for each one.

Section 7

This section inquires into the nature of the main fuel used separately for cooking, heating and hot water. Although ten answer options are presented for each one, Over 90% of urban households responded with the answer ‘natural gas’ for all three. Three dummy variables were created for cooking, heating and hot water to indicate whether the households used natural gas or an alternative fuel source.

7.5.2 Selection of assets to include in the index

In all fifty one asset variables were initially created from the annual household survey. The full list of assets along with their mean, standard deviation and sample frequency is provided in appendix 7B and 7C for both the urban and rural sectors. From this pool of assets, a process of selection was carried out to arrive at the final list of assets. This selection process is often criticized as being arbitrary (Howe et al., 2008), and no specific formulaic approach exists for choosing the variables to include in the final asset index. In the absence of a set process for asset selection, we outline our selection/rejection methodology, which took into account the following:

1. The list of assets must not be too large or overly complicated to make it impractical to collect by a researcher. We selected a list of thirty assets for the urban and rural sectors. The final list of thirty assets differed between the two sectors although they were selected from the same larger asset mix.
2. Apart from inter-variable correlation, more variation in the distribution of an asset leads to the probability of a higher weighting in PCA (McKenzie, 2005). Intuitively, if hardly any households have central cooling or if all households have access to electricity, then these two assets are unlikely to provide much information regarding the wealth of the households. To check for variation, the weighted mean, standard deviation and frequency of all asset variables were calculated. As a result a number of assets were dropped from the list. For the urban areas these included electricity, piped water, no durables (variable for households with no durables), house constructions of brick or stone/brick and central cooling. For the rural areas these included boiler packages, central cooling, wooden houses and sewage.
3. Essential to the success of an asset index is its ability to differentiate between a wide range of wealth levels for households. McKenzie (2005, p.10) points to two potential data problems in this regard, those of “clumping and truncation”. If there

are too few effective assets indicators, then households may be ‘clumped’ together in a few groups and the asset index will fail to produce a representatively wide distribution. Even if there are enough assets to provide a wide distribution, there may be sudden sharp differences between differing wealth levels and the index may be ‘truncated’. For example, this happens when assets which differentiate between the middle class and the rich are not included, or assets which can differentiate between the poor and the very poor.

McKenzie (2005) recommends plotting a histogram or probability density function of the final asset index to look for signs of clumping or truncation. Figure 7.5.1 displays the histogram for our final asset index for urban and rural areas. As can be seen there is no major skewing to the left or right or other major signs of clumping or truncation for the urban index. The rural index is not skewed but shows small signs of truncation in the middle of the distribution. This perhaps reflects on the fact that a separate asset questionnaire is necessary for rural areas to differentiate more smoothly between middle income wealth groups.

For comparison we have included the histograms (see figure 7.5.2) for the urban and rural socio-economic asset indexes of Brazil and Ethiopia created by Vyas and Kumaranayake (2006). As can be seen, the histogram of both Iran’s urban and rural asset index compares very favourably and despite the earlier highlighted data shortfalls, this indicates a relatively reliable raw dataset and an appropriate selection of assets in both indices.

Figure 7.5.1 Histogram of Iran's asset index, 2010

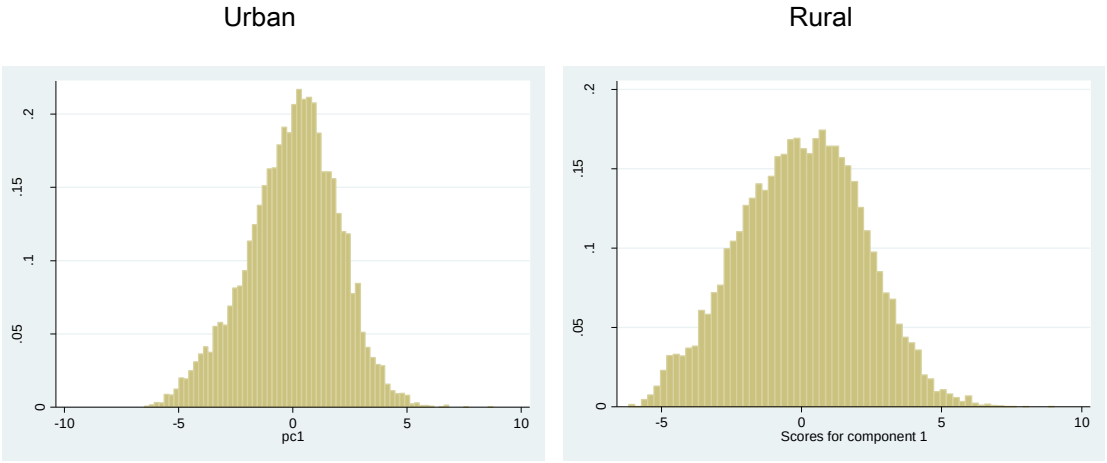
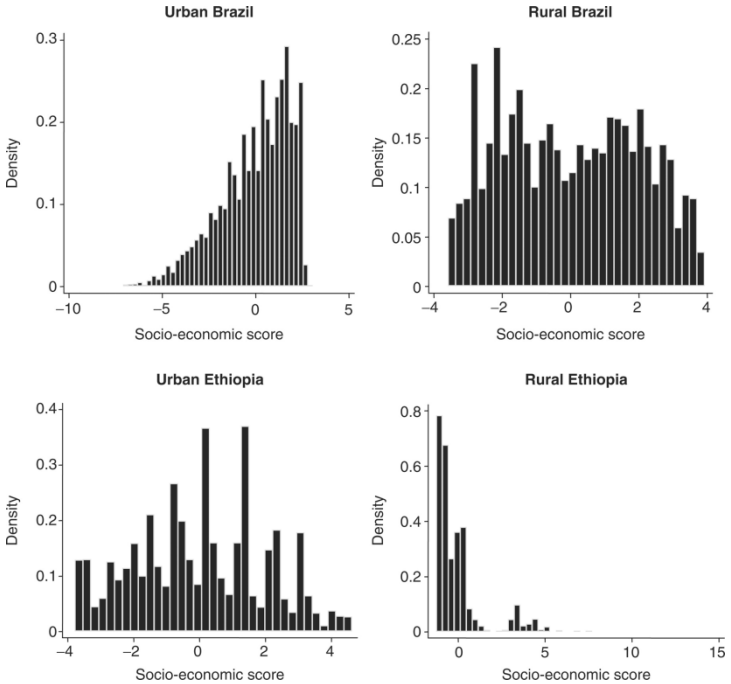


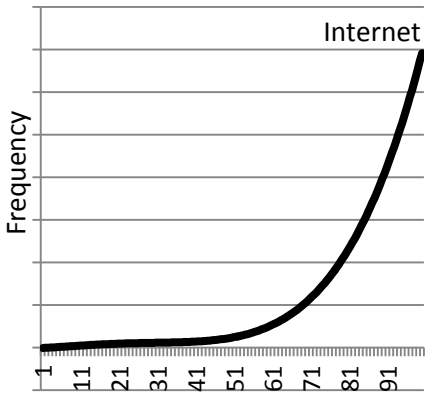
Figure 7.5.2 Asset indexes for Brazil and Ethiopia

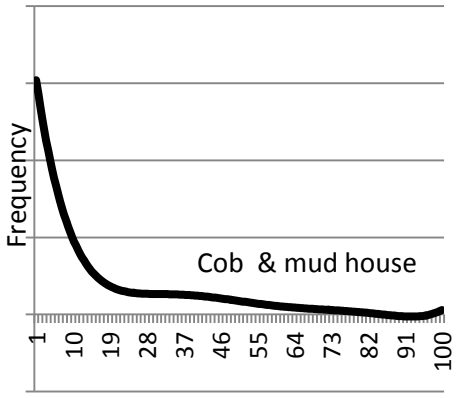
Reproduced from Vyas and Kumaranayake (2006)



4. The expenditure inequality analysis carried out in chapter four helped us to determine which assets were differentiating effectively between wealth levels. In short, the earlier analysis proved very useful in allowing us to calibrate the asset index. The frequency of all 51 assets was compared against the equivalence expenditure ranking of households to determine this. The final 30 selected assets were plotted against the eventual asset wealth index to get a picture of how they had contributed to the index. By checking individual asset ownership by the derived asset index wealth ranking, we are also verifying the internal coherence of the index (Vyas and Kumaranayake, 2006). A few pertinent examples are provided below for urban and rural areas.

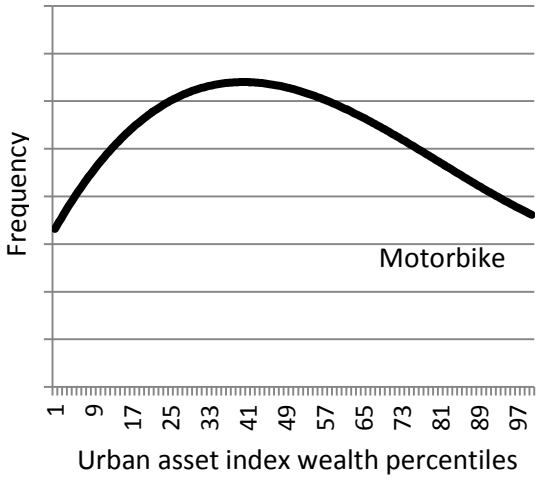
Figure 7.5.3 Frequency of urban asset variables by asset wealth percentiles, 2010

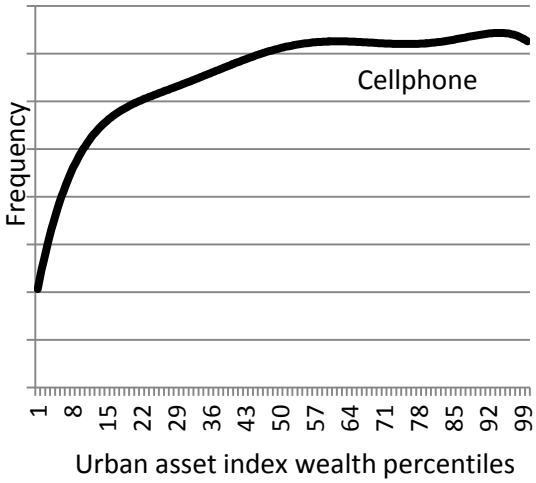




Access to the Internet in the household is an effective asset for distinguishing the middle class from the rich. The frequency of Internet access rises exponentially along the higher wealth percentiles.

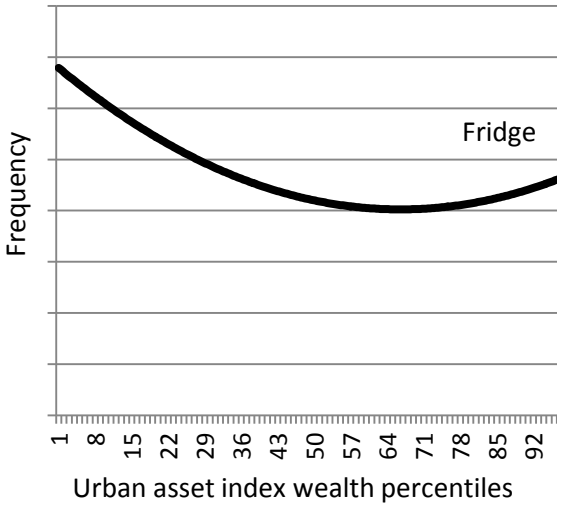
As expected, the very poor have a high frequency of mud houses. This falls sharply by the time we reach the second poorest quintile (the 20 mark). This asset provides a good way of distinguishing between the poor and the very poor.

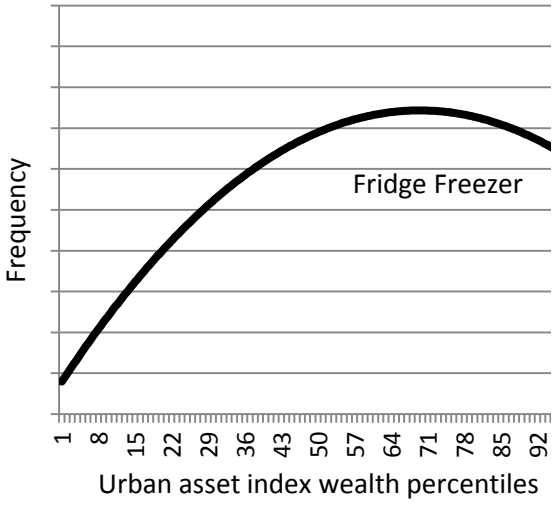




As households become more wealthy the ownership of motorbikes increases, but falls again among the much wealthier households. It peaks in the second quintile (the lower middle class). This asset distinguishes well between the lower middle class and other wealth groups. Note that this asset does not distinguish well between the very rich and the very poor.

The frequency of cellphones is minimal for the very poorest households, but leaps upwards as we make a small move up the wealth index. It provides a good asset for distinguishing the poor from the very poor.



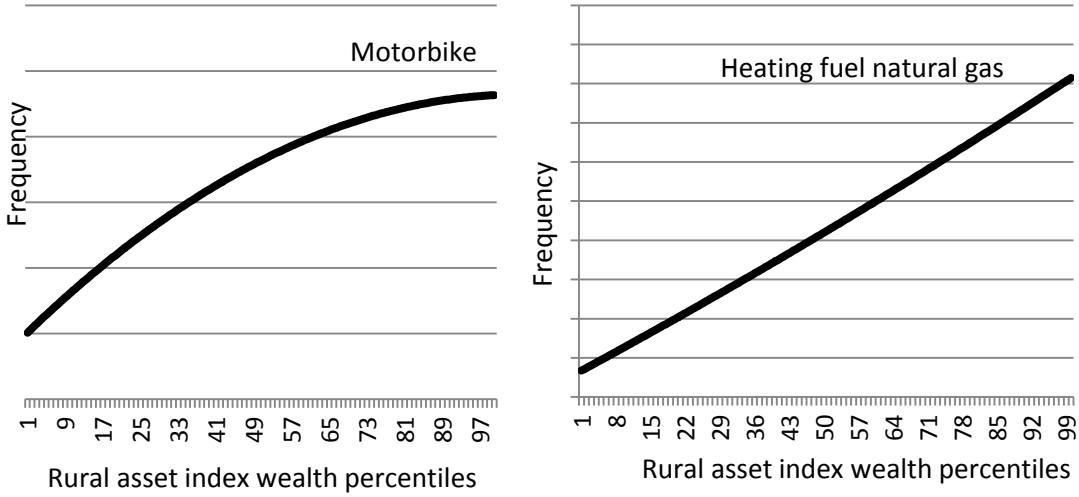


The frequency of fridges is actually highest for the poor. At first this may seem counter intuitive but it should be noted that the survey also has a separate question for a 'Fridge Freezer', which is more expensive and as can be seen on the right diagram is more prominent among the wealthy. The

According to the data, fridge freezers are favoured by the middle classes. The very rich buy both a standalone fridge and freezer, with the poor just buying a fridge.

lower number of fridge freezers for the very wealthy as opposed to the middle class suggests that the very wealthy would have enough funds or space for a separate fridge and a separate freezer.

Figure 7.5.4 Frequency of rural asset variables by asset wealth percentiles, 2010



Interesting to note that unlike urban households, where the middle income groups are the most prominent owners of motorbikes, for the rural areas it is the wealthiest group.

Unlike urban areas, an infrastructural asset such as natural gas (as a heating fuel) is a wealth distinguisher along almost the whole of the distribution in the rural sector.

5. A number of utility assets in urban areas failed to distinguish sufficiently between wealth levels. This makes sense as access to piped water, electricity or natural gas is now almost universal in urban areas. These assets were excluded from the index. Other telecommunication assets were included as the data revealed they are not yet universal in nature, and provided revealing wealth distinguishing information. These included the possession of telephones, cellphones and access to the Internet.
6. Finally, unlike our household expenditure analysis which was subjected to rescaling according to household size and makeup, assets are deemed to be utilized by all at

the household level (Filmer and Pritchett, 1998, McKenzie, 2005, Vyas and Kumaranayake, 2006) and no scaling was carried out to adjust for household size or makeup. Sampling weights were used as provided by the Statistical Center of Iran.

This selection process led to two lists of thirty assets for urban and rural areas to be subjected to principal component analysis in order to construct the asset index.

7.5.3 Differences in the urban and rural asset mix

Unlike the urban asset mix, many of the 'infrastructural and utility access' assets proved significant in distinguishing between expenditure levels in rural areas. For example the asset variables, piped gas, heating fuel, hot water fuel and cooking fuel differed across the whole expenditure distribution among households. We chose 'heating fuel by natural gas' as a proxy for all four variables in the rural index. Similarly, unlike urban areas, the availability of a dedicated bathroom or kitchen also differed throughout the distribution according to household expenditure. We included 'Kitchen' in the rural asset mix. From the list of durable assets, the ownership of a 'Colour TV' and a 'Bicycle' which were inconsequential in drawing up the urban asset index, were also significant in constructing the rural asset index.

Four variables which were present in the urban index, 'central heating', 'central cooling', 'packaged boiler heating' and 'wooden' constructed houses were almost non-existent in rural households and were excluded from the asset mix.

Table 7.5.1 Differences in the rural and urban asset mix

In rural not in urban	In urban not in rural
Heating fuel natural gas	Central cooling
Kitchen	Boiler
Colour TV	Wooden
Bicycle	Central heating

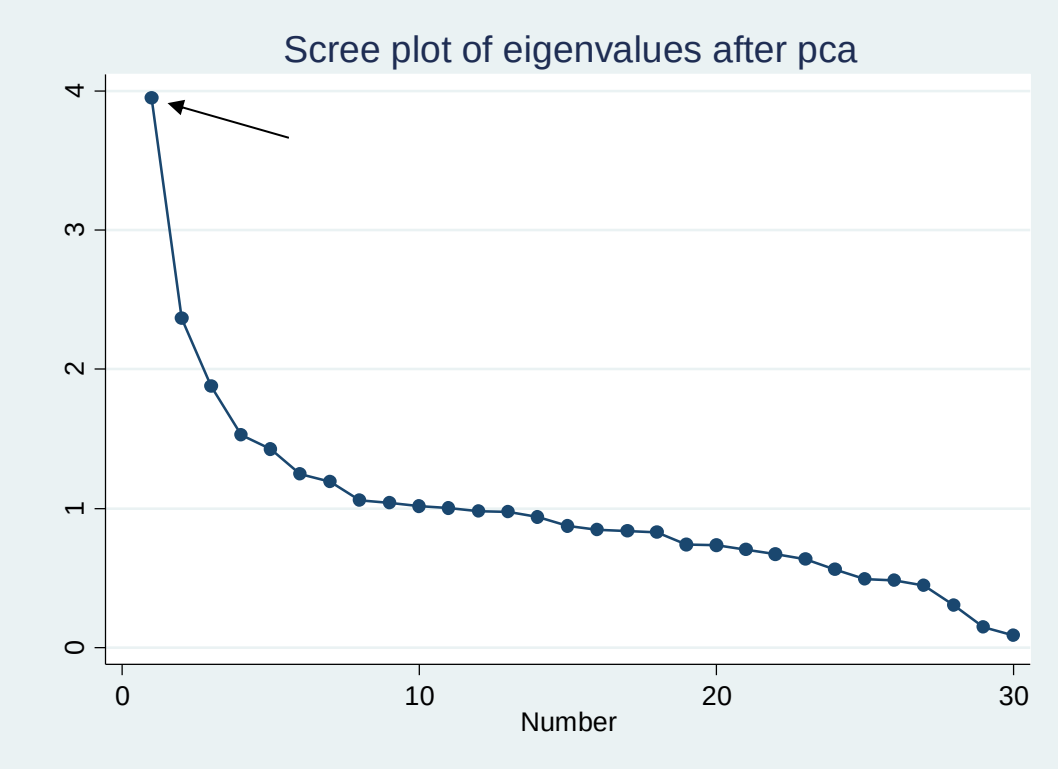
7.6 Iran urban asset index, 2010

Table 7.6.1 Our asset index terminology

Factor score	Weight given to each asset
Wealth score	The total score for an asset mix of an individual household
Wealth index	The distribution of wealth scores for all households

The urban asset index was derived from the first principal component of PCA on the final list of 30 urban assets. The eigenvalue for each principal component indicates the amount of the total variance explained, as the total sum of all eigenvalues equals the number of assets. The first eigenvalue is 3.95, the next highest eigenvalue is 2.36. Therefore, the first principal component explains the most variation in the underlying data by a sizeable margin.

Figure 7.6.1 Scree plot of eigenvalues after pca



In total percentage terms, the variation explained by the first principal component is just over 13%. In comparison to other studies which declare their eigenvalue, this value ranges from

11% (Vyas and Kumaranayake, 2006)to 27% (McKenzie, 2005). Inclusion of fewer assets typically leads to a higher proportion of the variation being explained by the first principal component, but inclusion of too few assets leads to the problems of clumping and truncation. We aimed for a balance between the two.

The final list of assets in the urban asset index are presented in table 7.6.2 with their associated ‘factor scores’ as derived from the first principal component of the PCA. The factor scores provide the weights for the assets. The mean for the wealth asset index as a whole is 0 (by design) and the standard deviation is 1.99. The poorest household has a wealth score of -6.5 and the richest +8.78. The distribution of the wealth scores is shown by the histogram represented in figure 7.5.1 (earlier).

As the factor scores are normalized by their mean and standard deviation in deriving the wealth score for each household, the factor score for a particular asset divided by its corresponding standard deviation indicates its effect on the wealth score. Apart from ‘household size’ and ‘number of rooms’ all other assets have a value of 0 or 1. Therefore, the difference between owning or not owning that asset is reflected in the ‘factor score/SD’ value. For ‘household size’, the value of each extra m^2 is reflected, and for the variable ‘number of rooms, the value of each extra room. For example the addition of a dishwasher to a household would increase its wealth score by 0.916, or the addition of a black and white TV would reduce its score by 0.772.

Table 7.6.2 Iran urban asset index, 2010

	Household assets	Factor score	Mean[103]	Standard Deviation (SD)	Factor Score / SD
1	Household size (m^2)	0.272	96.395	49.253	0.006
2	Number of rooms	0.250	3.456	1.128	0.221
3	Iron & brick or iron & stone	-0.083	0.545	0.498	-0.167
4	Steel	0.146	0.214	0.410	0.356
5	Reinforced Concrete	0.082	0.110	0.313	0.260
6	Cob & wood	-0.086	0.013	0.114	-0.749
7	Cob & mud	-0.073	0.012	0.107	-0.683
8	Wooden	-0.013	0.000	0.014	-0.911
9	Ownership	0.117	0.660	0.474	0.246
Durable Assets					
10	Electric fan	0.008	0.435	0.496	0.016
11	Sewing machine	0.212	0.583	0.493	0.430
12	Fridge Freezer	0.113	0.388	0.487	0.232
13	Computer	0.320	0.375	0.484	0.662
14	Car	0.293	0.373	0.484	0.606
15	Motorbike	-0.006	0.179	0.383	-0.015
16	VHS machine	0.199	0.634	0.482	0.413
17	Fridge	-0.087	0.638	0.480	-0.181
18	Music stereo	0.167	0.351	0.477	0.350
19	Freezer	0.210	0.287	0.452	0.464
20	Washing machine	0.320	0.760	0.427	0.748
21	Hoover	0.301	0.860	0.347	0.867
22	Black and white TV	-0.079	0.011	0.102	-0.772
23	Dishwasher	0.137	0.023	0.150	0.916
Utility access					
24	Fixed water cooler	0.158	0.612	0.487	0.325
25	Central cooling	0.052	0.006	0.079	0.650
26	Boiler	0.087	0.012	0.110	0.792
27	Internet	0.258	0.161	0.368	0.701
28	Telephone	0.231	0.876	0.330	0.700
29	Cellphone	0.212	0.884	0.321	0.662
30	Central heating	0.137	0.052	0.222	0.615

[103] Please note that the raw data was not standardized, and when it came to carrying out the PCA analysis, rather than using the covariance matrix, the correlation matrix[103] was used to account for the non-standardization of the raw data.

7.6.1 Coherence and robustness

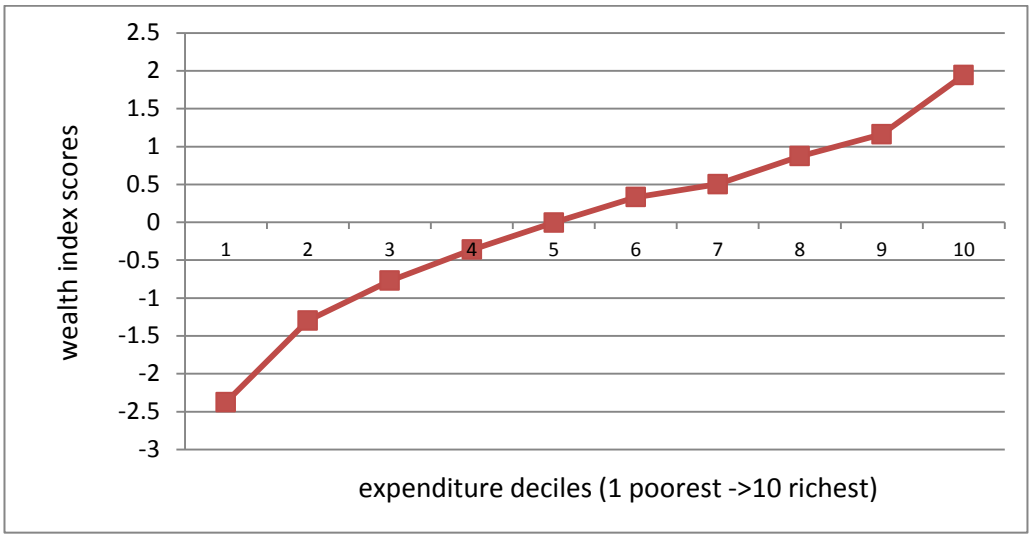
In order to gauge the validity and dependability of the urban asset index, it is common practice to evaluate it against a money metric index. We have used the expenditure analysis carried out in previous chapters to make a number of comparisons. As already noted, an asset index is focussed on wealth as opposed to household expenditure data which is commonly used as a proxy for income. Therefore, we would expect a different specific ranking of households but we would expect the overall groups (quintiles) to match. i.e. we would expect the wealthiest group to also spend the most on average, but the specific ranking of households within the whole distribution may be different. On this basis two questions present themselves.

1. Are the expenditure based household decile groups in line with the asset index calculated rankings?
2. Where in the distribution are the differences in the rankings most prominent?

Mean wealth asset index score of expenditure deciles

To find out how expenditure ranked household groups compare with asset index ranked households, we create weighted deciles based on expenditure data and calculate the mean asset index score for each decile. The table is provided in appendix 7D. The wealth index mean scores are in line with the household expenditure data and increase consistently with each of the ten deciles. For instance, a household in the seventh expenditure decile could move to the richest decile by adding a fridge freezer, central heating and a computer. A move from the second poorest decile to the poorest decile could be achieved by owning a black and white TV and not owning a fixed water cooler.

Figure 7.6.2 Urban mean wealth index score by household expenditure deciles, 2010



7.6.2 Ranking differences with expenditure based data

Specific rankings differ between the two. Table 7.6.3 shows the proportion of households[104] which are ranked within the same quintile whether using the asset index or expenditure based methodology. It is evident that the expenditure rankings of the poorest and richest households are more in line with the asset index than the centre quintiles.

We can therefore deduce that the expenditure rankings for Iran's urban areas distinguish wealth better at the two extremes of the distribution rather than the middle of the distribution. As expected the percentage of households ranked in the same quintile is slightly higher when households are ranked by expenditure without taking household size and makeup into account. This is because we have not rescaled the asset index according to size or makeup either.

[104] We have used weights to calculate the % of households in the population, not % of households in the sample. The two sets of figures did not actually differ significantly, but this table is more accurate of the underlying population.

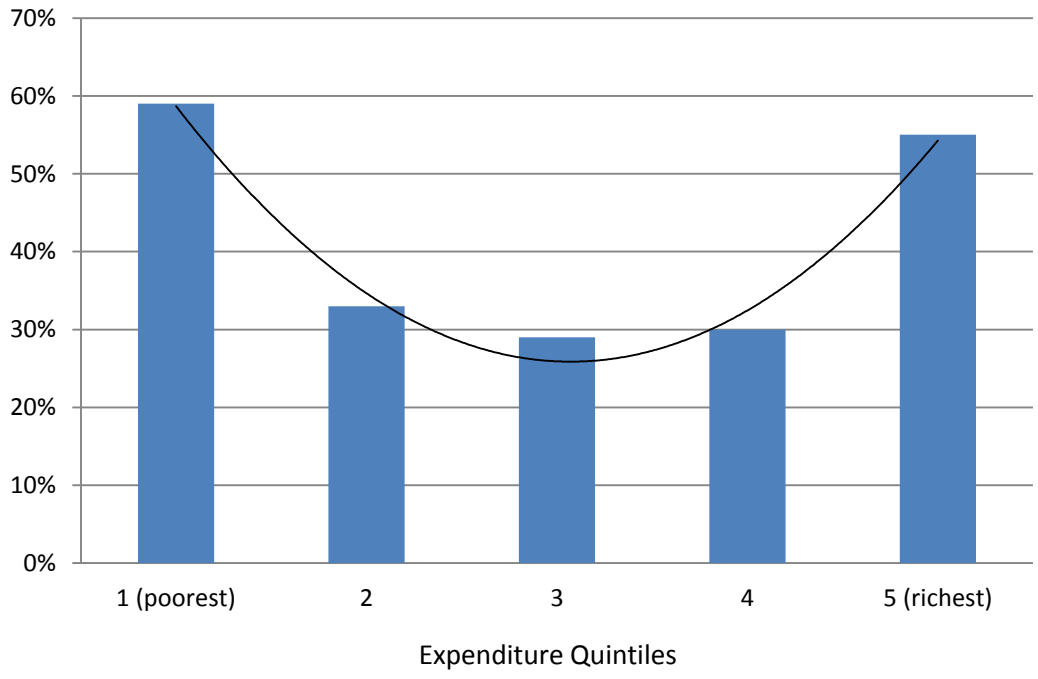
Table 7.6.3 Percentage of urban households ranked the same by asset index as expenditure

Percentage of urban households ranked in the same quintile by asset index as ranked by expenditure methodology

	Percentage of urban households ranked the same by asset index as expenditure	
Quintiles	Expenditure scaled for household size	Expenditure not scaled for household size
1 (poorest)	52%	59%
2	29%	33%
3	25%	29%
4	26%	30%
5 (richest)	48%	55%

Figure 7.6.3 Percentage of urban households ranked the same by asset index as expenditure

Percentage of urban households ranked in the same quintile by asset index as ranked by expenditure methodology (not scaled for household size)



The spearman rank correlations for the sample data between the expenditure distribution and the urban asset index are 0.59 ($p < .0001$, $N = 18{,}701$) for equivalence household expenditure and 0.68 ($p < .0001$, $N = 18{,}701$) for non-scaled household expenditure data. This indicates a significant amount of consistency between the two distributions. It compares to a spearman rank correlation of 0.64 for Nepal, 0.56 for Indonesia and 0.43 for Pakistan as reported by (Filmer and Pritchett, 1998).

7.7. Iran rural asset index, 2010

The final list of assets in the rural asset index, along with their factor scores are presented in table 7.7.1. The first Eigenvalue of the PCA is 4.83, more than double the next highest Eigenvalue which is 1.94. The first principal component explains 16.1% of the variation. The total number of households in the sample is 19,584. The mean of the asset index is zero (by design) and the standard deviation is 2.2. The maximum wealth score of a household is 9.03 and the minimum is -6.17.

Figure 7.7.1 Scree plot of eigenvalues after pca

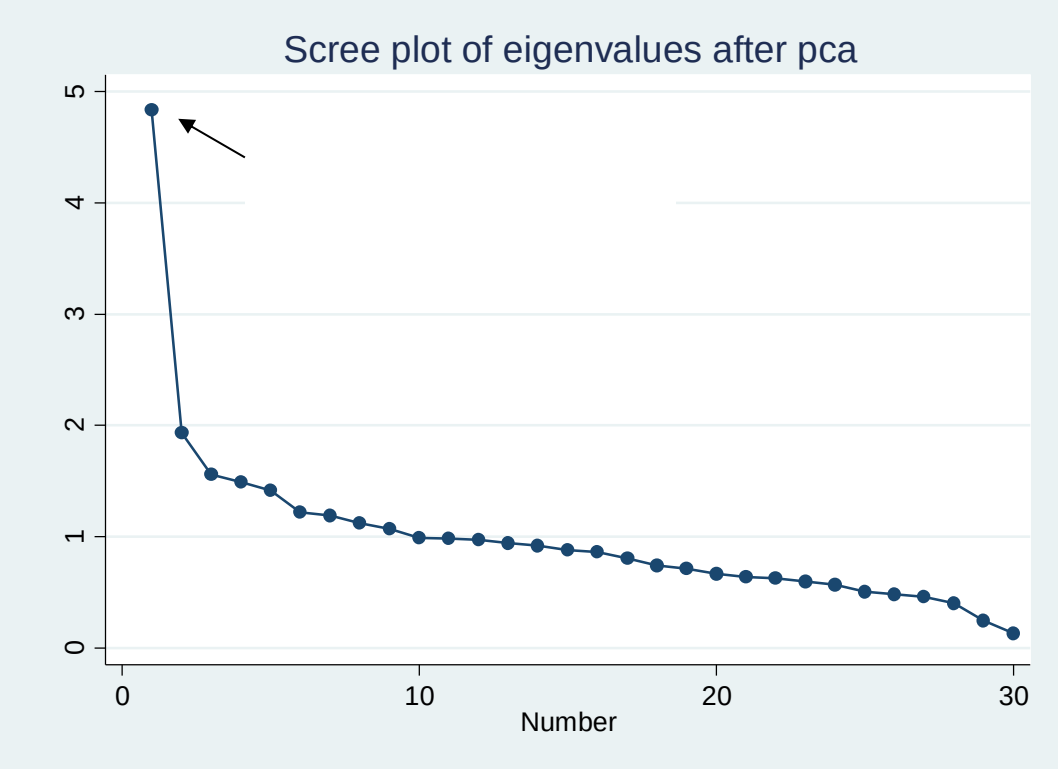


Table 7.7.1 Iran rural asset index, 2010

	Household assets	Factor score	Mean	Standard Deviation (SD)	Factor Score / SD
1	Household size (m^2)	0.29	82.24	42.30	0.01
2	Number of rooms	0.28	3.26	1.19	0.24
3	Iron & brick or iron & stone	0.15	0.40	0.49	0.31
4	Steel	0.05	0.04	0.19	0.25
5	Reinforced Concrete	0.06	0.05	0.22	0.28
6	Cob & wood	-0.14	0.11	0.32	-0.44
7	Cob & mud	-0.07	0.04	0.20	-0.36
8	Ownership	0.04	0.85	0.36	0.11
	Durable Assets				
9	Electric fan	0.09	0.56	0.50	0.18
10	Sewing machine	0.23	0.42	0.49	0.47
11	Fridge Freezer	0.15	0.20	0.40	0.38
12	Computer	0.22	0.10	0.30	0.72
13	Car	0.21	0.18	0.38	0.54
14	Motorbike	0.10	0.31	0.46	0.21
15	VHS machine	0.19	0.49	0.50	0.39
16	Fridge	-0.10	0.81	0.39	-0.25
17	Music stereo	0.14	0.23	0.42	0.33
18	Freezer	0.19	0.13	0.33	0.56
19	Washing machine	0.29	0.38	0.49	0.60
20	Hoover	0.31	0.54	0.50	0.61
21	Black and white TV	-0.09	0.02	0.14	-0.67
22	Dishwasher	0.03	0.00	0.03	1.04
23	Colour TV	0.20	0.93	0.25	0.79
24	Bicycle	0.12	0.08	0.27	0.45
	Utility access				
25	Fixed water cooler	0.14	0.26	0.44	0.32
26	Heating fuel natural gas	0.19	0.40	0.49	0.38
27	Kitchen	0.26	0.82	0.39	0.66
28	Internet	0.14	0.03	0.17	0.81
29	Telephone	0.22	0.70	0.46	0.48
30	Cellphone	0.25	0.73	0.44	0.57

The asset with the most positive effect on a change in a household's wealth score is a dishwasher and the asset with most negative value is a black and white TV. Interestingly as with the urban areas, ownership of a standalone fridge decreases the wealth score. By contrast unlike the urban areas, the ownership of a motorbike increases the wealth score. The differing factor scores and indeed the differing optimum mix of assets for the rural sector confirms the necessity of deriving separate asset indexes for urban and rural areas.

The mean decile rural asset scores underline how a change in just a handful of assets can determine the position of a household in a particular wealth decile. For example, a household in the eighth decile can move to the richest decile by the addition of a freezer, washing machine and dishwasher.

Table 7.7.2 Mean decile wealth scores of rural households, 2010

Deciles	Mean	Std. Err.	[95% Conf. Interval]	
1	-3.85	0.02	-3.89	-3.82
2	-2.40	0.01	-2.41	-2.38
3	-1.57	0.01	-1.58	-1.56
4	-0.87	0.00	-0.88	-0.86
5	-0.25	0.00	-0.26	-0.25
6	0.35	0.00	0.34	0.36
7	0.95	0.00	0.94	0.96
8	1.57	0.01	1.56	1.58
9	2.31	0.01	2.30	2.33
10	3.76	0.02	3.71	3.80

7.7.1 Internal coherence

In table 7.7.3 we present the ownership percentage of a number of assets in rural areas by the asset index quintiles. Intuitively, the results confirm the internal coherence of the asset index. Ownership rises with higher wealth quintiles for the assets 'car', 'computer' and 'natural gas heating fuel', but falls for 'black and white TV' and 'cob & mud house'.

Households with a kitchen rise steeply as we move from the poorest quintile to richer quintiles, but level off quickly.

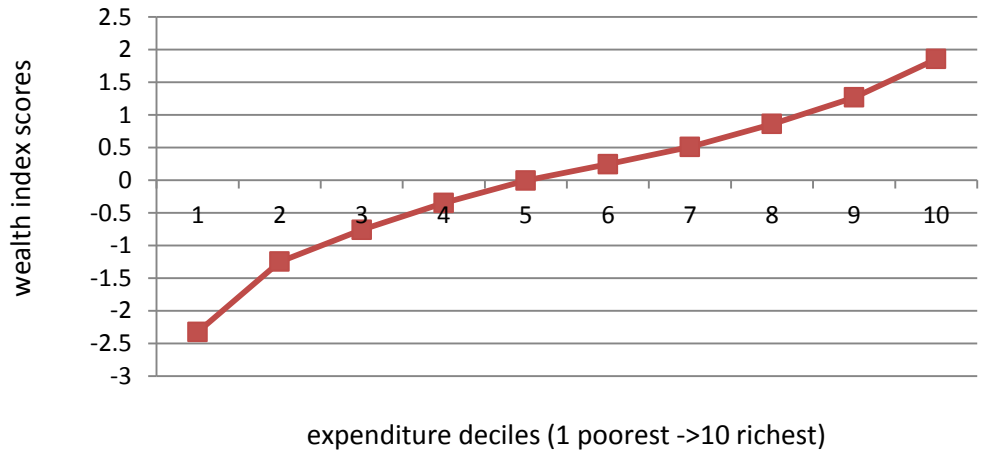
Table 7.7.3 Percentage of asset ownership by wealth quintiles, rural households 2010

	Quintiles poorest > richest				
	1	2	3	4	5
Computer	0.01%	0.38%	1.87%	6.83%	41.26%
Cob & mud house	10.18%	5.02%	3.13%	2.14%	0.81%
Black and white TV	7.83%	0.93%	0.41%	0.62%	0.14%
Car	1.43%	4.88%	10.56%	18.86%	51.85%
Kitchen	36.82%	79.09%	94.14%	98.13%	99.68%
Natural gas as the heating fuel	12.84%	24.92%	39.61%	55.36%	68.26%

Mean wealth asset index score of expenditure deciles

Similar to the urban index, we test for consistency of rural wealth group rankings with household expenditures by creating weighted deciles based on rural expenditure data and calculating the mean rural asset index score for each decile. The table of results is provided in appendix 7E. As can be seen in figure 7.7.2 the rural wealth index is consistent with the overall expenditure group rankings. For each higher expenditure decile, the mean wealth score rises consecutively.

Figure 7.7.2 Rural mean wealth index score by household expenditure deciles, 2010



7.7.2 Ranking differences with expenditure based data

Approximately half of the poorest and richest households in the rural sector are ranked in the same quintile whether using the expenditure rankings or the asset index rankings. For the remaining three middle quintiles, approximately a quarter are ranked the same. Similar to the urban index, it shows that the rural index is best matched with household expenditure at the extremes of the distribution.

Figure 7.7.3 **Percentage of rural households ranked the same by asset index as expenditure**

Percentage of rural households ranked in the same quintile by asset index as ranked by expenditure methodology (not scaled for household size)

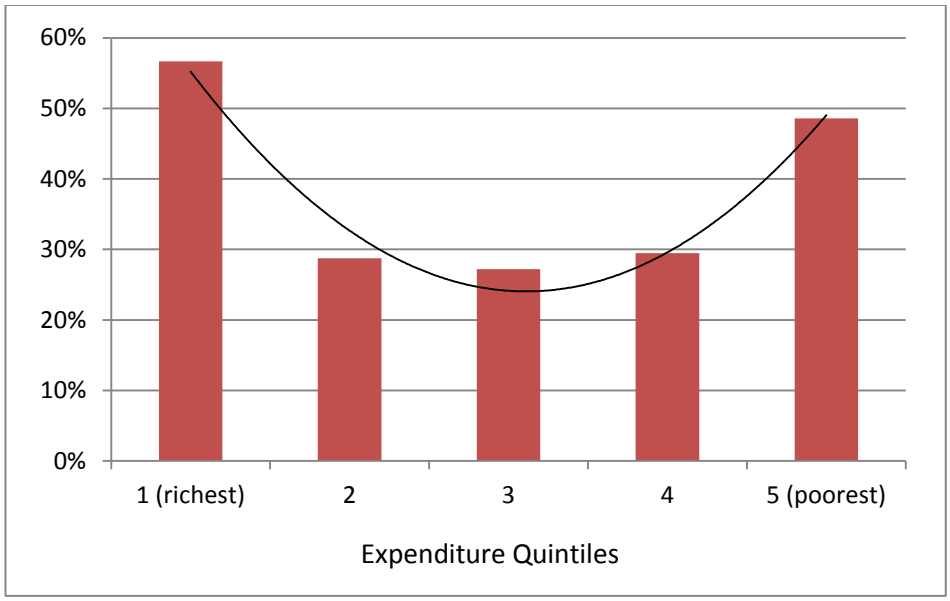


Table 7.7.4 Percentage of rural households ranked the same by asset index as expenditure

Quintiles	Expenditure scaled for household size	Expenditure not scaled for household size
1 (poorest)	49%	57%
2	26%	29%
3	25%	27%
4	27%	29%
5 (richest)	46%	49%

The spearman rank correlations for the sample data between the expenditure distribution and rural asset index are 0.51 ($p < .0001$, $N = 19{,}584$) for equivalence household expenditure and 0.60 ($p < .0001$, $N = 19{,}584$) for non-scaled household expenditure data. Although this indicates a significant amount of consistency between the two distributions, the correlation is less than it was with the urban index. This seems to indicate that either rural wealth or expenditure indicators need improvement, or in rural areas expenditures are not as good a sign of long run wealth as they are in urban areas.

7.8 Concluding remarks

In this chapter, we created two wealth based asset indices for the urban and rural sectors of Iran. Micro data from the 2010 SCI annual household survey was used. An asset index is a complementary methodology alongside money metric measures as it cannot provide insight into absolute differences nor give rise to universally understood inequality figures.

Nevertheless, asset indices may prove particularly useful for inequality research in rentier states which are prone to macroeconomic shocks. By focusing on durable assets rather than expenditures, short terms shocks may be filtered to reveal the underlying trend of inequality. Wealth indices can act as a proxy for wealth for a wide range of research studies not only in economics but also other disciplines. The asset index can also act as a "control variable in estimating effects of variables potentially correlated with household wealth, such as maternal education" (Filmer and Pritchett, 1998). Unlike the intricate and cumbersome process of analysing raw expenditure or income data, once an asset index has been created, researchers can quickly and easily estimate the wealth rank of a particular household. This simplicity should encourage more Iran researchers, of all fields, to take into account the inequality and wealth aspects of the studies they carry out.

Both the derived urban and rural indices in this study were found to be consistent and provide reliable approximations for household expenditure groupings, and may be used by future researchers. The urban index is partially better calibrated than the rural index, due to the assets listed in the survey questionnaire.

Ideally, in the future, the SCI should include a dedicated questionnaire for drawing up an asset index, with separate questionnaires for urban and rural areas. Researchers can improve this index by making use of polychoric principle components analysis (Kolenikov and Angeles, 2009, Kolenikov and Angeles, 2004) and explore methodologies for combining the two indices into one index (Rutsein, 2008).

8. Conclusion

8.1 Introduction

In this chapter, we present a structured conclusion of the major findings of this research. Although our empirical analysis has been centred on Iran, there are wider theoretical implications from this study for other rentier states.

In the introduction to this thesis, we noted that the motivation for the research was partially driven by the desire to gain an understanding of the overall inequality patterns in Iran. This would assist future analysis on a particular branch of inequality, which may otherwise prove too challenging to study in isolation, given the absence of published papers on the wider trends of income distribution. We attempt to present the 'big picture' of Iran's inequality patterns in this chapter.

Our findings are categorized into the four groupings of methodology, literature, empirical results and the insights gained from the creation of the asset index. A number of policy implications relating to Iran and other rentier states are then explored. We suggest research areas which naturally follow on from this thesis, and finish the chapter by delving into the wider implications arising from this study.

8.2 Place of findings in the overall literature

The bulk of the research in this thesis relates specifically to Iran and fits into the Iranian economy literature family. The findings can also be interpreted as a case study for income inequality in rentier states, as the thesis explores the mechanisms through which income distribution is shaped in a rentier setting.

In relation to household survey literature, several methodological conclusions arise pertaining to inequality measurements and the derivation of an asset index. Finally, as regards income inequality literature in general, this study relates the story of how structural

challenges can prevent the success of otherwise well formulated policies aimed at improving income distribution.

8.3 Hypothesis and specific research questions

This thesis had two major objectives. The primary objective was to empirically ascertain the main patterns and trends of vertical and horizontal inequality in Iran. The secondary objective was to find out if a relationship exists between the rentier nature of a state and its income distribution by surveying and extending rentier theory literature.

We hope that we have broadly met both these objectives; and hence largely confirmed our hypothesis that a rentier state, such as Iran, develops a unique pattern of structural inequality, which is difficult to alter as long as the economy is reliant on oil revenues.

Specifically we sought the answers to the following research questions (reproduced from the introduction):

Descriptive empirical questions

1. What are the recent levels and trends of urban and rural national inequality?
2. What are the geographic component contributions to overall inequality?
3. What are the levels of inequality between the provinces?
4. What is the pattern of inequality within the provinces?
5. What are the trends of urban/rural disparity?
6. What is the level of ethnic inequality?

Analytical empirical Questions

1. What factors account for the small year on year fluctuations in the national inequality measure?

2. What structural effect does direct government expenditure of a rentier state have on income distribution?
3. How are subsidies affecting inequality, and what is the likely effect of their removal?
4. Are urban or rural areas within provinces converging? Is there evidence of polarization?
5. Are inequalities within provinces related to income levels?
6. What are the differences of the urban/rural divide along the national income distribution?
7. Are ethnic inequalities converging or diverging?
8. What are the income distribution differences between private and public sector headed households?
9. Can an effective asset index be created for Iran from existing household data to provide an alternative measure less prone to oil shocks?

In addressing these broad questions, a considerable amount of data was analysed and only the results relating to our hypothesis were presented in the thesis.

8.4 Summary of Findings

This study presents a wide range of findings which come together to present a picture of income inequality in Iran specifically, and for a rentier state in general. In broad terms, the findings support our extension of rentier theory as it relates to income distribution. We find consistent income inequality with fluctuations linked to the fortunes of the richest groups. Oil rents and government expenditure have a structural and not a direct impact on income distribution. The urban bias of government spending is apparent and has substantially raised the urban sector's share of overall income.

Although government subsidies, prevalent in most rentier states, are found to benefit the rich in absolute terms, the removal of such subsidies is not expected to significantly reduce inequality given that fuel and utilities comprise a small proportion of overall expenditure for the rich. A decomposition of inequality reveals that income disparities in Iran are now dominated by the urban sector, with three major cities contributing to over one third of the observed inequality. As expected in a rentier setting, there is a growing urban/rural gap in real terms, which is also not decreasing in relative terms.

There are major inter-regional disparities with a minor sign of urban convergence and a major trend of rural divergence. Together with the finding of considerable variations of within inequalities for adjoining rural areas, the results point to a picture of rural regions which show signs of dispersion and isolation in terms of relative income. We found no simple geographic characterization of provincial inequality, and the commonly accepted 'rich central v poorer periphery model' no longer seems apt for Iran. Although there are no signs of polarization, a number of provinces seem rooted to the bottom of the provincial rankings, with the poorest, Sistan and Baluchistan, diverging away from other provinces.

Inequality within the provinces varied widely and was not related directly to expenditure levels. As expected, given the high urban unemployment rates, we found no sign of the Kuznets inverted U shaped inequality curve. In ethnic terms, there is a rapidly shrinking gap between Persian dominated and ethnic dominated regions, with some

ethnicities doing better than others. This negates the notion of a Persian rentier class diverging from other ethnic groups. The ethnic regions were also no more homogenous than the Persian dominated ones, in terms of income distribution.

In line with our rentier theory predictions, public sector headed households are very much advantaged over private ones, creating a significant horizontal inequality. The within income distribution of public sector households is, however, much more equal, having a decreasing effect on vertical inequality. In Iran's case, the number of exclusively public headed households is declining.

In the following sections we present these findings and their significance in more detail.

8.4.1 Methodology findings

The methodology carried out in the preparation and analysis of the raw household micro data led to a number of insights.

Define a wider expenditure aggregate

In rentier states, where substantial food and utility subsidies may exist, the consumption aggregate should not be defined too narrowly as this will lead to misleading inequality findings. Indeed if such a narrow measure is used, inequality is bound to be underestimated. For instance, we recommend the inclusion of expenditure on durables. It became evident that the choice of expenditure components can significantly impact the ultimate inequality measure.

Use an equivalence scale

By not using an equivalence scale (many Iran researchers and the SCI do not seem to use them) inequality is underestimated for Iran. Not scaling household expenditure will also

misrepresent the rural contribution to inequality and will underestimate inter-provincial inequality between provinces. The urban/rural divide will also be underestimated. The differing expenditure makeup and family household makeup of the urban and rural sector and of certain provinces lead to this misrepresentation.

Do not use GDP/capita figures to assess income distribution

Regional GDP/capita figures can be very misleading in a rentier state. In Iran's case we even found the removal of the oil component still led to vastly different provincial rankings from expenditure based inequality measures. For instance, this can be due to isolated industrial complexes which are based in a province for tax purposes with little linkages to the local economy.

Beware of using snapshot years

Given the macroeconomic fluctuations of a rentier state, researchers should be wary of using snapshot years for reporting trends such as convergence/divergence and inequality patterns. For more constant trends such as population shifts the use of snapshot years is acceptable.

Misleading population and income shares

The use of official weights from the SCI household surveys for the years 1998-2004 leads to an unrealistically constant annual urban and rural population share. See appendix 3C.

8.4.2 Literature findings

A review of the literature points to vertical and horizontal inequalities being regarded as significant concerns in Iran's political economy discourse, both pre and post revolution. Since the 1979 revolution, the limited published research suggests a high level of inequality

with no equalizing trends apparent in the income distribution pattern, despite poverty reduction and rural development programs. Existing evaluation of inequality in Iran has emerged through the prism of post-revolutionary policy appraisals or as a mere side statistic in poverty analysis.

Given the constancy of inequality, in spite of changes both in policies and the ruling administrations adopting them, closer attention should be paid to long-term structural barriers, which may be hampering income redistribution. By carrying out a review of rentier theory we hypothesized the main structural barrier to be the dominance of oil exports in the Iranian economy. We are suggesting that an extension of the implicit inequality implications of rentier theory can serve as the theoretical framework, underpinning the structural nature of inequality in Iran. A reliance on oil exports brings about its own dominant socio-political structures which are difficult to shift, even after an Islamic revolution.

As most income distribution research relating to Iran usually forms the secondary objective of a wider poverty study, there is a tendency to focus on economic policies rather than underlying economic structures. The variations in the poverty rate lend themselves to observing what has changed rather than what remains the same. Our empirical study, and findings by Nomani and Behdad (2006, p.33) and Salehi-Isfahani (2008, p. 29) however point to principally structural determinants of income distribution. When it comes to inequality in Iran, and possibly other rentier states, there is a need for more focus on the entrenched structures of the economy rather than short-term government policy. A decoupling of income inequality from poverty research is necessary in order to take this intuitive step.

8.4.3 Creation of an asset index

We suggest that an asset index can prove especially useful in a rentier state as it can 'ride above' the income distribution fluctuations deriving from frequent macroeconomic shocks. For instance, the asset index can be used as a wealth proxy, less prone to short-term shocks, in studies on education levels.

Given the lack of such indices for Iran, we created a separate asset based wealth index for the urban and rural sector respectively. Both indices were shown to be coherent and in keeping with rankings based on household expenditure. The urban asset index was deemed to be more accurately calibrated than the rural index. Ideally a separate asset questionnaire should be used for assets in rural households to build up a more definitive rural index. The asset indices should also prove useful for future researchers who wish to find a quick and practical way of estimating income/wealth distribution.

8.4.4 Empirical study findings

Table 8.4.1 Summary of empirical findings

Category	Finding	Importance
Vertical inequality **1997-2010**		
National inequality	Consistently high (above 0.40 GINI) annual inequality with fluctuations and a noticeable drop in 2008 (but still above 0.40).	Despite poverty alleviating measures, a high level of inequality still persists. Successive pre and post revolution administrations have been unable successfully tackle the high rate of inequality.
Fluctuations in inequality	The inequality measure which is most sensitive to the top of the distribution is also the most volatile.	The fortune of the rich mostly determines the annual fluctuations in the inequality rate.
Drop in inequality in 2008	There is a significant and sustained[105] drop in inequality in 2008. This is found to be predominantly due to a fall in the real expenditures of the richest groups.	Poverty alleviation is unlikely to significantly reduce inequality. Effective taxation of the rich is much more likely to bring about a fall in inequality.

[105] Sustained until 2010 which the last year of the period under research.

Oil rents/Gov. expenditure and inequality	There seems to be no direct link between either the level of oil rents or government expenditure or oil led growth to the observed year on year fluctuations in income inequality.	Oil rents may determine the underlying structures of inequality but do not directly cause an increase or decrease in the inequality figure.
Gov. expenditure and urban bias	Although government expenditure may not have directly affected changes in the inequality figure, it has affected its composition by heavily favouring the urban sector.	As predicted by rentier theory, government expenditures have a significant urban bias; leading to a rise in the urban composition of inequality by increasing urban income share.
Subsidies	The subsidies prevalent until 2010 clearly benefited the richest groups in absolute terms. The fuel rationing scheme introduced in 2007 had a negligible effect on income inequality and the subsequent observed drop in the 2008 inequality figure was not due to this scheme.	Although subsidies may be benefitting the rich in absolute terms, their abolition may not have a very significant impact on inequality. This is due to the low percentage of household expenditures accounted for by fuel and utilities (although this percentage rises modestly once subsidies are lifted).

Urban rural divide	The high ratio of urban to rural income almost mirrors the annual fluctuations in the GINI figure.	The urban rural divide plays a significant role in Iran's annual inequality fluctuations.
Decomposition by urban/rural sector	The urban sector's share of income and hence its contribution to overall inequality has risen consistently. From a 60% contribution to overall inequality in 1990 to almost 75% in 2010.	It is the urban sector that is key to reducing overall inequality. Rural development programs should not be expected to have a significant impact on overall inequality.
Decomposition by the urban provinces	While the 'between' contribution of urban provinces has been falling, their 'within' contribution is on the rise. By 2010, the inequality 'within' three major urban provinces (Tehran, Mashhad and Esfahan) accounts for 35% of all inequality in Iran.	This indicates that the urban sectors of provinces are becoming more homogenous in relation to each other but have consistently high unequal income distributions. The key to achieving a significant inequality drop in Iran lies within these major urban areas.

Decomposition by the rural provinces	In contrast to urban areas, the rural sector displays a pattern of growing inequality between the provinces and a lowering of inequality 'within' them.	The income and population transfer to urban areas has led to a more locally homogenous but nationally fragmented rural sector.
Inter-provincial inequality		
Choice of measure GDP v household expenditures	GDP/capita can lead to misleading results for provincial inequality in a rentier state. Even if the oil component is removed the provincial rankings are still very different from an analysis based on household expenditures.	Researchers should be cautious of regional inequality studies based on GDP, especially in a rentier state.
Significant inter-provincial inequality	Major differences exist between provincial mean household expenditures. These differences were accentuated due to the use of equivalence scales that took into account urban and rural differences in household makeup. The mean household expenditure of the richest and poorest province differed by more than a factor of three.	As well as a high level of prevailing vertical inequality, geographic horizontal inequalities are also high.

Rich central v poor periphery?	The traditionally accepted picture of a rich central region v poor periphery does not emerge. We find this simplistic misconception to have been based on GDP/capita figures and former administrative boundaries.	Regional inequality in Iran cannot be characterized by a simple geographic explanation. The picture of regional inequality which emerges is much more intricate and requires further research.
Geographic characterization of inter-provincial inequalities	As stated we found no simple geographic pattern to the inter-provincial inequalities. Instead, what was noticeable was the relatively larger rural sector of the poorest provinces.	One significant, if expected, factor explaining inter-provincial differences is the size of the rural population in the province.
Convergence/Divergence	We found evidence of significant inter-provincial rural divergence and a modest convergence of urban areas. Combined together this leads to an overall result of no convergence or divergence between the provinces.	Urban areas may be becoming more homogenous in relation to each other (but exhibiting high within inequality). Rural areas are becoming more fragmented.

Polarization	Unlike a previous study, we found no evidence of inter-provincial polarization. However, there is a trend of divergence between Tehran (the richest) and Sistan and Baluchistan (the poorest) province.	In line with the convergence/divergence results there is no overall trend of polarization between Iran's provinces.
Provincial mobility	The very top and bottom ranked provinces in terms of household expenditure seem to be firmly rooted in place. The middle ranked provinces change places regularly.	A key to improving inter-provincial inequality is to provide special assistance to the poorest provinces that seem firmly stuck at the bottom.
Growth and inter-provincial convergence	We find no clear-cut link between growth and inter-provincial convergence in Iran. There is a very significant positive correlation for 2000-2007 but no correlation for the other years in our study.	Growth alone (oil led growth) will not achieve convergence between Iran's provinces and reduce horizontal inequalities.
Inter-provincial inequality and migration data	We find that, in the main, the latest available provincial migration data are in line with the inter-provincial rankings based on household expenditure.	Ranking provinces by household expenditure is an acceptable method of gauging inter-provincial inequalities.

The poorest province Sistan and Baluchistan	We found that the ethnic province of Sistan and Baluchistan ranks worst in all our inequality calculations. It has the lowest mean household expenditure, the highest level of internal inequality, the lowest GDP/capita figure, the lowest UN HDI figure and exhibits the highest number of children per household. In terms of ethnicity, its expenditure is decreasing in relation to the dominant Persians and relative to all other ethnicities.	Sistan and Baluchistan province requires targeted policy attention. It is clear that any central sectoral policies aimed at reducing inequality are bypassing this province.
Intra-provincial (within) inequality		
Spread of intra-provincial inequality	The level of inequality within the provinces varies widely, from a GINI of 0.32 to a GINI of 0.48 in 2010.	This wide gulf of within provincial inequality provides fertile research ground for policy makers to investigate a number of the underlying causes of inequality in Iran.

Relationship to expenditure levels and to other provinces	We find no direct relationship between expenditure levels and the degree of inequality. We also find that the levels of intra-provincial inequality do not move together; i.e. changes in their within inequalities do not seem related to each other.	Local determinants are a key to reducing overall inequality in Iran.
Inequality and Kuznets	Unlike a previous study we find no evidence of Kuznets's inverted U shaped inequality curve for Iran's provinces.	Increasing expenditure levels will not by themselves decrease the high within inequalities prevalent in many of Iran's provinces.
The Urban/Rural factor	One significant factor in determining within provincial inequality is the degree of the urban-rural divide in the province. This factor naturally becomes less significant the lesser the provincial share of the rural sector in terms of population and income.	Similar to the national picture, on the provincial level, the urban/rural divide is a significant factor in determining the level of inequality. Although this is becoming less important as the rural sector shrinks.

Inequality clustering	There is some evidence of urban inequality geographic clustering. However there is no such evidence for rural areas with widely different inequality rates for adjoining provinces.	This builds on the finding of urban sector convergence, and provides support to the notion of an increasingly shrinking and fragmented rural sector.
Ethnic Inequalities		
Persians v other ethnicities	There is a rapidly shrinking but still sizeable gap between the dominant Persian population and all other ethnicities combined.	Despite persistently high inter-provincial inequality, the expenditure gap between ethnic regions is closing. This could be due to a conscious policy focus by the ruling administration or simply a reflection of its possible multi-ethnic makeup.

Urban/rural dimensions of the ethnic gap	The ethnic gap is only prevalent among the urban areas and there is no significant ethnic divide between the rural sectors.	Coupled with the finding that government expenditure is biased towards urban areas, the finding of the solely urban nature of ethnic inequality highlights how a change in the provincial distribution of government expenditure can impact economic ethnic inequality.
Within ethnic inequality	As with the Persian dominated regions the ethnic dominated provinces also exhibit widely different internal inequality rates. They are not more homogenous than the Persian regions.	Ethnic regions are prone to the same inequality determinants as the Persian ones.
Ranking of ethnicities	We provided a ranking of all ethnic dominated regions according to their mean household equivalence expenditure.	There is considerable inequality between the various ethnic regions.

Ethnic convergence/divergence	With the stark exception of Baloochis, the mean household expenditure of most ethnicities has converged towards that of the Persians. However, there are still significant differences in the performance of various ethnicities.	This builds on our earlier finding that the province of Sistan and Baluchistan requires special policy attention.
Rural/urban Divide		
The rural urban gap	There is a growing gap between urban and rural households in terms of expenditure. This gap has grown in real terms by a factor of 2 between 1997 and 2010.	In line with rentier predictions on inequality, the urban bias of the economy is leading to an expanding urban sector and a shrinking rural one.
Geographic representation of the rural/urban gap	There is no simple geographic pattern to provincial rural/urban disparities. This gap is also not dependent on the provincial mean household expenditure level. For instance, both the richest and poorest province have a large rural/urban divide.	The determinants of the gap between urban and rural areas in Iran's provinces are not simple ones. Local factors seem to be playing a key role in determining the size of this gap. This area merits further research.

Distribution comparison of the rural/urban divide	The biggest gap between urban and rural sectors is exhibited between the richest and poorest households. i.e. the gap is at its highest between the richest urban to the richest rural and the poorest urban to the poorest rural households. There is a distinct U shaped curve that characterizes the decile ratios of these two distributions.	This finding suggests that the rural poor and rural rich may feel the most incentive to move to urban areas. This is in line with our suggestion in chapter four that rural to urban migration is probably characterized mostly by the top and bottom rural income groups.
Private v Public Sector Households		
The public / private gap	There is a significant and growing gap between the wealthier public sector and the poorer private sector households. This gap in expenditures has increased in real terms by a factor of almost 3 from 1997 to 2009.	This finding sits very well with rentier theory, which predicts a bias in rent distribution towards the public sector.

Distribution comparison of public and private sector households	The poorer the households the larger the relative gap between public and private sector headed family expenditures. In 2010 for example there is a 1.5 difference for the richest decile but a much larger 2.0 difference for the poorest decile.	This finding confirms the gap between public and private sector households and highlights how accentuated this horizontal inequality is for poorer households.
Within inequality in private and public sector households	Public sector households exhibit a significantly lower inequality than private headed households.	The public sector has the dual effect of reducing vertical inequality, but as we have seen from the previous findings, it increases horizontal inequalities.
Rural/urban dimensions	The gap between the public and private sector is even more pronounced in rural areas.	
Prevalence of the public sector household	The proportion of exclusively public sector headed households has been shrinking for the period under study. It has halved in urban areas between 1997-2010 and shrunk even further (by a factor of three) in rural areas.	The importance of public sector wage rises as an allocative tool to decrease vertical inequality is becoming less significant.

8.5 Policy implications for Iran

In this research study, we have not specifically focussed on income inequality determinants per se; nor have we explored a number of noteworthy categories of potential inequality such as gender, religious, sectoral (manufacturing, agricultural, services) and occupational. We are therefore not in a position to recommend an exhaustive list of equality augmenting policy recommendations.

Rather, by researching the rentier characteristics, specific vertical and horizontal patterns, and recent regional trends of inequality in Iran, we can at best suggest where the focus and direction of government policy should lie, in order to bring about a significant impact on income distribution.

This study also points to numerous existing policies that on the surface may seem to improve income distribution but have clearly failed to create a significant downward shift in income inequality. These include consistent oil-led economic growth, expansion of higher education availability, rural infrastructural investment, rural development and housing programs, successful poverty alleviation and the promotion of industry outside the major urban areas.

8.5.1 Structural change

Robinson (2002, p.10) divides inequality decreasing policy recommendations into two categories:

Category 1 Increasing “human-capital-augmenting investment”

These relate to improvement of education, health, housing etc.

Category 2 Stimulating “transactions that directly or indirectly redistribute income”

These relate to both private and public sector transactions.

However, as the literature review and the empirical study have demonstrated, despite measures by the post-revolutionary administration in engaging in "human-capital-augmenting investment" (category 1 policies), inequality has remained stubbornly high. We have also argued throughout that economic transactions that can alter redistribution (category 2 policies) are suppressed and overwhelmed in a rentier state.

Hence, given our rentier inequality hypothesis, our primary policy recommendation for income inequality reduction is to bring about the major structural change of substantially decreasing economic dependence on oil export revenues. In essence, our findings indicate that inequality in a rentier state is an entrenched problem not shifted with basic sectoral policy changes. In his pioneering article, Mahdavy (1970, p.466) alludes to this idea of chronic economic difficulties within a rentier state even if government policy is not flawed: "Even with the *best of organizations*, [use of italics are this author's addition] Rentier States will still have a number of special problems which they will have to solve if their economic growth is to continue smoothly"

As long as the economy is dominated by a revenue stream, without domestic linkages, accruing directly to the state, not only will there be a high level of inequality but also a formidable parallel perception of unfairness in society. As Karl (2004, p.15) suggests, in a rentier state the rich are only perceived as being rich due to privilege or a connection to the state.

The path to less oil-dependence for Iran, whether through a lowering cap of oil revenues in each successive annual budget, or a push towards international economic integration, or by adopting other mechanisms is beyond the scope of this study. What is clear, is that the rentier nature of the state is the primary structural barrier to overcome in order to successfully implement income inequality reduction policies. A decreased dependence on oil should also lead to less macroeconomic volatility and hence less inequality fluctuations, and the emergence of clearer longer term trends in the income distribution. Beyond this primary recommendation of a structural shift to a non-oil dominated

economy, in the following sections, we make a number of policy suggestions based on the research carried out; subject to three caveats:

1. The following recommendations only relate to inequality. For instance the proposition of a policy focus on urban areas is not to suggest that rural development programs should be dropped. Or the suggestion that poverty-alleviating measures do no impact favourably on inequality should not be misconstrued as the author suggesting these measures be abandoned.
2. We make the following policy recommendations with the acknowledgement of their possible ineffectiveness or impracticality unless there is a move towards non-oil dependence, and also without any regard for their political viability.
3. The policy implication of every single finding has not been explored, only those relating to the major patterns and trends. Other researchers may spot additional policy recommendations based on the empirical findings.

8.5.2 Urban focus

The decomposition of inequality in chapter four, made it evident that the nature of inequality in Iran has morphed into an urban one. In chapter three, we found that the methodology adopted by the SCI substantially overestimates the contribution of rural areas to inequality. There is no paradox if extensive post-revolutionary rural development programs (Sharbatoghlie, 1991) have failed to bring about a more egalitarian distribution of income; as it is clearly the urban sector which accounts for the overwhelming share of income (85% by 2010).

The thrust of government redistribution policies should have a major bearing on urban areas if there is to be any signficant lowering of the national GINI. As the findings in chapter four demonstrate, more than a third of all inequality in Iran can be attributed to inequality within just three urban population centres. The recent lifitng of universal subsidies

is a policy step in the right direction, but unlikely to have a signficant impact given the low proportion of expenditures on utilities and fuel. More effective would be the creation of urban sector employment, which should also lead to private sector wage increases for existing employees. As noted earlier in this study, Iran's unemployment rate has averaged above 12.5% for the 1997-2009 period. Given that new manufacturing industry is barred from locating in major urban centres, such as the capital city Tehran, (for environmental and regional development reasons), employment generation policies in urban areas should be a priority for the government.

8.5.3 Fiscal tools to target the rich

In the literature review, we highlighted the tendency of welfare researchers on Iran to primarily focus on poverty and treat inequality very much as a secondary side issue. The notion of policy following research is apt in this case. The focus on rural development and poverty reduction programs while admirable and necessary, should not be deemed sufficient for meaningful inequality reduction.

This empirical study has indeed demonstrated that major changes in Iran's income distribution can only be brought about by a focus on urban areas and the very rich; the exact opposite of poverty reduction policies. Alleviating the plight of the poor will have a limited effect on the headline inequality figure. Our findings show a noticeable fall in the GINI figure only when the top decile loses income share.

Iran needs to introduce fiscal tools for targeting the richest income groups. These could include:

- A progressive income tax to be enforced for all. At the moment only officially registered employees pay income tax. Many rich entrepreneurs do not pay income tax.

- A rising scale stamp duty on property transactions. The current rate is very low. This also has the advantage of being a difficult tax to evade.
- Capital gains tax on most investments

The introduction of such taxes is politically difficult in a rentier state, as by definition, it is the richest groups who command the most political clout. Even when a non-progressive VAT tax[106] was introduced in 2008 at a rate of only 3%, the rich merchant classes of the 'Bazaar' vehemently protested the measure.

8.5.4 Provincial targeting

Two main policy recommendations emerge from the provincial inequality findings. The first relates to the finding that GDP/capita figures are not the appropriate measure for identifying regional inequality in a rentier state such as Iran. This is the case even if the oil component is removed. Policy makers should rely on measures that calculate inequality from the household level up.

Numerous policy recommendations have already been put forward in the literature to tackle Iran's high regional disparity, such as: a move towards decentralization (Amirahmadi, 1986), increasing agricultural R&D investment (Karbasi and Mojarad, 2008), better transportation (Farmanesh, 2009) and targeting border regions (Lotfi et al., 2011). Apart from dismissing the traditional central v border characterization of provincial inequality in Iran, we cannot comment specifically on these recommendations, as we have not carried out an extensive study on the determinants of regional inequality. We can however note that during the 1997-2010 period there has been no discernible overall household expenditure convergence among the provinces. Although, we find small-scale urban convergence and

[106] The VAT rate was initially introduced at a rate of 3% (1.5% VAT and 1.5% excise) with many exemptions. It is currently 5% (2012), although it is expected to increase further in the coming years.

considerable rural divergence. The aforementioned policy recommendations have to be appraised against this backdrop.

Apart from a consistently high level of inter-provincial inequality, our findings suggest that certain provinces seem to be rooted to the bottom of the regional rankings year on year. General sectoral policy has not only failed to reduce regional inequality but it seems to have failed certain provinces more than others. This lends support to proponents of targeted regional assistance. Unlike countries such as South Africa or Malaysia (Stewart 2001) Iran has not adopted a targeted policy approach for specific ethnicities or provinces.

Thus, the second policy recommendation is the formulation of a framework for researching and tackling determinants, which are holding back economic prosperity in these specific regions. The exact nature of the directed policy, whether in the shape of more economic autonomy or surplus central investment funding requires further discussion and research, but it is evident that the needs of certain provinces are not being adequately addressed by sectoral policy implemented at the national level. This idea also applies to certain ethnic groups such as the Baloochis or Turkmens who seem to be falling behind other ethnicities.

8.5.5 Urban-rural integration

Both the trend of considerable divergence among rural areas and the pattern of diverse within inequalities between adjoining rural provinces (unlike urban provinces), point to a fragmentation of the rural sector. The consistently increasing share of the urban sector in terms of both income and population also supports this finding. Policies aimed at achieving a degree of integration between these rural areas and their urban counterparts may mitigate their further demise.

China could act as a model for Iran in this regard. China's experimental CURD "Coordinated Urban-Rural Development" zones, have been setup to direct a set of

experimental policies aimed at narrowing the gap between these two sectors (Salverda et al., 2011, Schultz, 1961). These include public finance relief both in terms of tax relaxation and extra funding, decentralization for a handful of 'experimental' rural areas, improved social security, infrastructural funding and multiple other micro policies directed towards meeting specific local requirements.

This new approach emerges from a realization that "Macro-level national policy making is ill at addressing a myriad of local specificities" (Salverda et al., 2011, p.357). The concept of local policy delegation is one that Iran's national policy makers need to embrace. It is still too early to judge the success of the "CURD" zones, but such innovative non-sectoral programs may also prove effective in tackling inter-provincial inequalities. Indeed China sees "CURD" as one of the tools for reducing inequality between the coastal and inland regions (Sheng 2011).

8.5.6 Horizontal inequality monitoring

In certain circumstances, reductions in the headline vertical inequality measure may be more efficiently brought about by policies targeting specific horizontal inequalities; the Malaysian favourable treatment of the indigenous Bumiputera (Stewart, 2001), is an example of this. These policies can only be implemented if there is continuous research on the extent and nature of major perceived inter-group inequalities.

For instance, the close monitoring of ethnic, gender, religious, private/public sector, functional and occupational disparities, would allow administrators to evaluate the likely income distribution effects of any targeted policies, and to also assess the impact of existing policies. Neglecting horizontal inequalities will not only hamper the general drive for an egalitarian society but may also lead to disharmony and conflict.

8.5.7 Lifting of sanctions and global economic integration

Iran has been under some form of sanctions regime for almost its whole post-revolutionary existence. Sanctions have intensified tremendously since 2010. We do not yet have the data to evaluate the effect of this latest round of sanctions on income distribution. However, we can speculate that sanctions are likely to result in both augmenting and diminishing inequality tendencies.

Sanctions will have countless distributary effects on the economy, such as limiting the import and export of goods to a select number of powerful groups; others will simply be priced out of such transactions. They close off international markets, placing export and import reliant industries at a disadvantage. By drawing down foreign currency reserves, sanctions lead to a depreciation of the local currency, disproportionately affecting those with a higher cash savings asset mix, and those who are dependent on imported goods. Most export-oriented industries cannot take advantage of the depreciation due to sanctions. Overall, economic growth is diminished. In the case of sanctions on oil exports, the state will gradually become less rentier in nature.

The net effect of these outcomes on income distribution also depends on the government's re-allocation of resources in reaction to the sanctions regime. In Iran's case, based on its record during the Iran-Iraq war period, the government will probably implement safeguards for the poorer groups (such as rations, direct cash payments, price controls on basic foodstuffs etc.). Coupled with declining oil revenues, we speculate that a restrictive international sanctions regime may actually reduce income inequality significantly, with the very large caveat that the economic wellbeing of the whole population will also decrease.

Given the prediction of a likely fall in inequality during the sanctions regime, why do we advocate a lifting of sanctions and integration with the global economy, specifically in relation to income distribution? The answer is that the long-term prosperity of many disadvantaged groups lies in access to new markets.

For instance, new export markets for manufacturing, services and agriculture; tourism for the provinces; liberal global business culture may benefit women; ethnicities such as the Arabs and Azeri Turks may find a competitive advantage in trade with their regional ethnic counterparts; investment by multi-nationals may allow many private sector wage earners to catch-up with their public sector counterparts. Assuming there is no substantial increase in oil exports, increased trade would also lower the dominance of oil revenues on the economy. This rather rosy picture of the effects of global economic integration on inequality is in contrast with the experience of many countries; see for example (Schütz et al., 2008) who finds that the economic integration component of globalization increases inequality. But given Iran's investment in human-capital augmentation to create a large skilled workforce, many groups and geographical regions may be able to improve their relative ranking by gaining access to bigger markets, and not having to operate within a closed rentier setting.

8.6 Limitations and future research questions

As noted in the introductory chapter, the approach to this study has been based upon carrying out research on several major vertical and horizontal income distribution patterns in Iran, rather than narrowly focusing on one aspect in particular. This was due to the unavailability of published studies on a wide range of potential major disparities, which made the significance and analysis of one particular inequality measure difficult to judge in isolation. This broad approach was also influenced by the desire to analyse various aspects of income distribution within a rentier framework.

Following our findings on Iran' dominant inequality patterns and trends, future research can perhaps be more focussed on one particular aspect of income distribution such as gender or occupation. Such specialization can only take place within a broader understanding and framework of inequality in Iran.

Several other research areas also methodically follow from this study:

- Apart from the rural/urban divide, what are the other significant factors contributing to such a wide variation of inequality within the provinces? Why do we witness an urban clustering of such ‘within’ inequality?

- We suggested that GDP/capita is not an effective method of gauging inter-regional inequalities for rentier states. Future research can however look at the components of the GDP for each province and investigate the impact of regional sectoral policy on provincial expenditure inequalities.

- Despite a significant increase in the availability of higher education, why has this not translated into an improvement in Iran’s income distribution pattern? Although we have put forward the rentier nature of the economy as the main culprit, the exact mechanisms that are preventing education from influencing economic prospects in a rentier setting need further exploration.

- Future household datasets (post 2010) may be used to investigate the duel effects of sanctions and the lifting of general subsidies on income distribution. Should a prolonged period of effective ‘oil export’ sanctions be imposed on Iran, this would provide a valuable opportunity for studying whether any rentier characteristics of the Iranian economy begin to dissolve, such as the constancy of high income inequality.

8.7 Wider implications and final word

This research indicates the need for a clear set of accepted standards in the preparation and reporting of inequality figures. Such standards will prove particularly advantageous for carrying out cross-country comparisons. Seemingly minor methodological choices in the processing and aggregation of micro household data not only result in a differing headline figure, but also significantly distort the contribution of the inequality components to the final measure. Thus, the lack of clear methodological standards, may in some cases be leading to policy distortions and erroneous research conclusions.

This study is yet another reminder of the intricate nature of inequality. Unlike poverty, whose treatment may be more universal in nature, we have argued that inequality is very much dependent on the structure of the national state and is not always easily shifted by government sectoral policy. What works in India, may not work in Iran. Our central policy recommendation of a need for structural change, in order to bring about improvements in income distribution, is likely to be applicable to other rentier states.

Mahdavy (1970, p.466), in his pioneering paper on the rentier state, reaches the conclusion that it is not the commonly cited “availability of capital” which is crucial to economic development, but rather the *process* of obtaining it. Following our research findings, we can extend this analogy to inequality. Policies leading to consistent growth, human capital investment, rural infrastructural development and poverty reduction may not in themselves have a significant impact on income distribution, if the state structure within which they are implemented is flawed. The rentier state is an example of such a flawed structure.

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Appendices

Appendix 3A Iranian Solar Hejri Years and the Gregorian Equivalent

1354*	21. March 1975 – 20. March 1976
1355	21. March 1976 – 20. March 1977
1356	21. March 1977 – 20. March 1978
1357	21. March 1978 – 20. March 1979
1358*	21. March 1979 – 20. March 1980
1359	21. March 1980 – 20. March 1981
1360	21. March 1981 – 20. March 1982
1361	21. March 1982 – 20. March 1983
1362*	21. March 1983 – 20. March 1984
1363	21. March 1984 – 20. March 1985
1364	21. March 1985 – 20. March 1986
1365	21. March 1986 – 20. March 1987
1366*	21. March 1987 – 20. March 1988
1367	21. March 1988 – 20. March 1989
1368	21. March 1989 – 20. March 1990
1369	21. March 1990 – 20. March 1991
1370*	21. March 1991 – 20. March 1992
1371	21. March 1992 – 20. March 1993
1372	21. March 1993 – 20. March 1994
1373	21. March 1994 – 20. March 1995
1374	21. March 1995 – 19. March 1996
1375*	20. March 1996 – 20. March 1997
1376	21. March 1997 – 20. March 1998
1377	21. March 1998 – 20. March 1999
1378	21. March 1999 – 19. March 2000
1379*	20. March 2000 – 20. March 2001
1380	21. March 2001 – 20. March 2002
1381	21. March 2002 – 20. March 2003
1382	21. March 2003 – 19. March 2004
1383*	20. March 2004 – 20. March 2005
1384	21. March 2005 – 20. March 2006
1385	21. March 2006 – 20. March 2007
1386	21. March 2007 – 19. March 2008
1387*	20. March 2008 – 20. March 2009
1388	21. March 2009 – 20. March 2010
1389	21. March 2010 – 20. March 2011
1390	21. March 2011 – 19. March 2012
1391*	20. March 2012 – 20. March 2013

Years marked with an asterisk * denote a Hejri leap year

Source: Persian calendar by Holger Oertel, http://www.ortelius.de/kalender/pers_en.php

Copied from Wikipedia: http://en.wikipedia.org/wiki/Iranian_calendars

Appendix 3B Household sample numbers

Year	Urban	Rural	Total
1990	9,085	9,345	18,430
1997	10,967	10,982	21,949
1998	8,285	9,192	17,477
1999	12,731	14,733	27,464
2000	12,320	14,621	26,941
2001	12,337	14,624	26,961
2002	15,114	17,038	32,152
2003	10,959	12,175	23,134
2004	11,619	12,915	24,534
2005	12,925	13,970	26,895
2006	14,175	16,735	30,910
2007	15,018	16,265	31,283
2008	19,381	19,707	39,088
2009	18,665	18,203	36,868
2010	18,701	19,584	38,285
Total	**202,282**	**220,089**	**422,371**

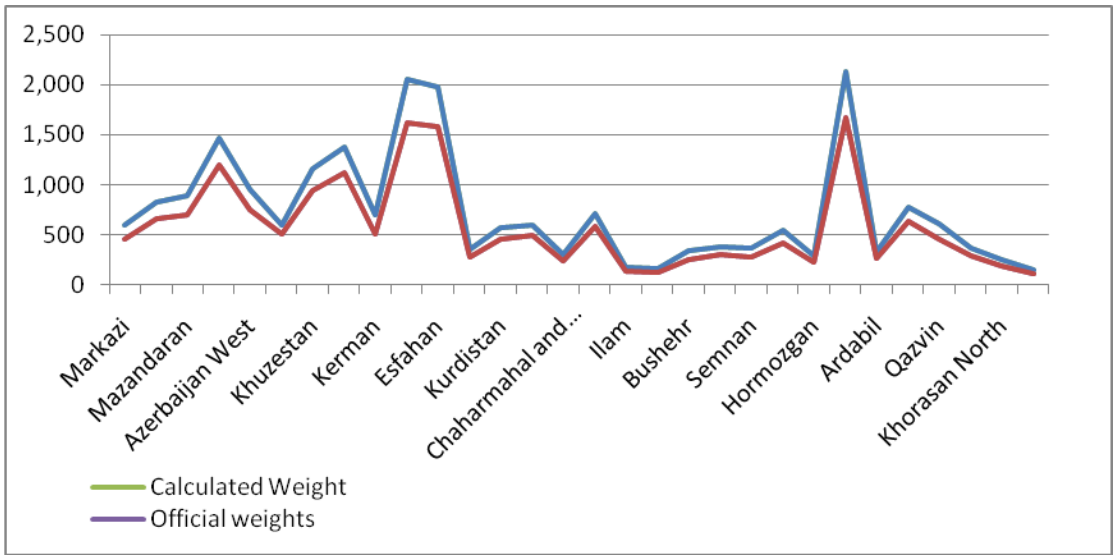
Appendix 3C Anomalies in the data

Figures for certain urban households in 1378 for non-food expenditure reported by SCI differ from the author's figures. The author checked and verified these measurements manually and the author's figures remain the same. The database used by the author is the latest database made available by SCI.

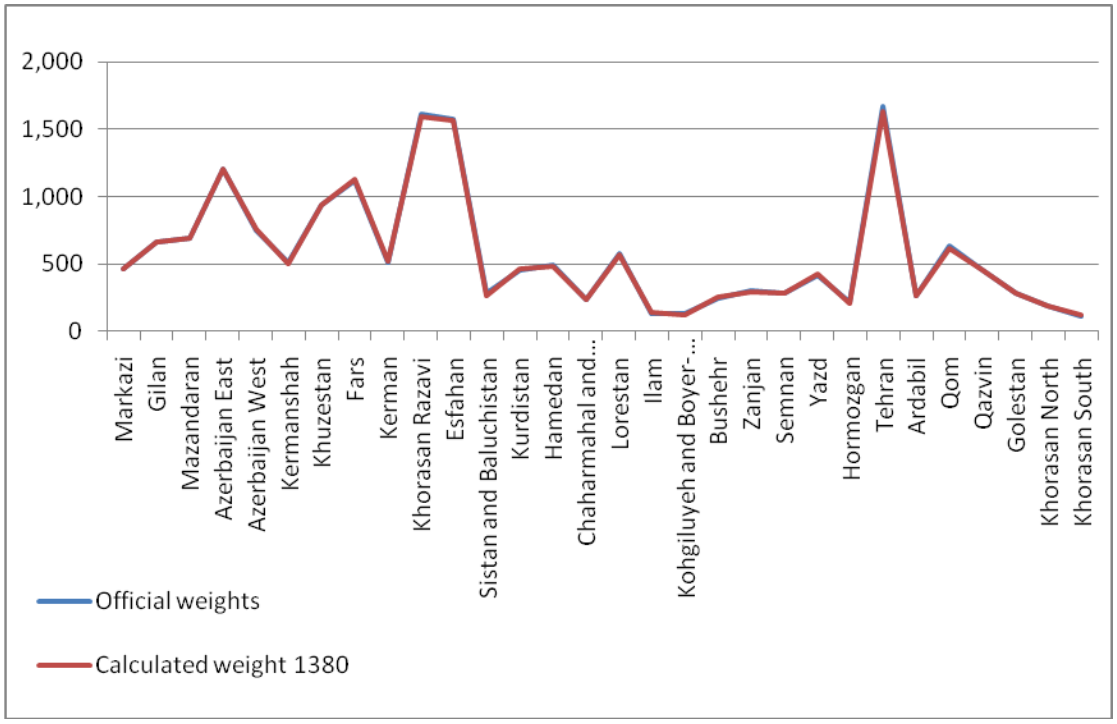
A choice of weights

The household survey data is stratified by province. Although from 2008 onwards, it is stratified at the PSU level. Before the official annual household survey weights were released by the SCI, this author calculated the provincial stratified weights using census data for the total number of households in each province. The total number of households in each province was simply divided by the sample number.

Comparison of sample weights 2007 – Calculated v official weights



The official SCI weights seem to be based on a calendar year from a reference year in the past. For example when the author used the total household numbers data from 2001 to calculate the weights for 2007, there was almost an identical match with the official SCI weights. Note how in the chart below you can hardly see the blue line as it aligns perfectly with the red line of the official weights.



For 1998-2004, the author found that when carrying out inequality calculations using the SCI official weights, this would lead to the awkward and unlikely result of exactly the same population share between rural and urban areas year on year.

Year	Pop Share Urban	Pop Share Rural
1998	0.64323	0.35677
1999	0.64323	0.35677
2000	0.64323	0.35677
2001	0.64323	0.35677
2002	0.64323	0.35677
2003	0.64323	0.35677
2004	0.64323	0.35677

Nevertheless, the author chose to use the official weights as provided by the SCI for the years available. For the years, they were not available, the author calculated weights using census data.

Appendix 3D Stata Modules and Commands

FASTGINI

```
cap run http://fmwww.bc.edu/repec/bocode/f/fastGINI.ado
view http://fmwww.bc.edu/repec/bocode/f/fastGINI.hlp
```

INEQDECO

```
cap run http://fmwww.bc.edu/repec/bocode/i/ineqdeco.ado
view http://fmwww.bc.edu/repec/bocode/i/ineqdeco.hlp
```

Calculating basic inequality for each year

```
cap run http://fmwww.bc.edu/repec/bocode/i/ineqdeco.ado
log using x:\phd\vanalysis\results\1388.smcl
insheet using x:\phd\vanalysis\results\data\1388t.csv
ineqdeco eehewi [w=w], bygroup(ru)
clear
insheet using x:\phd\vanalysis\results\data\1388u.csv
ineqdeco eehewi [w=w], bygroup(pc) summarize
clear
insheet using x:\phd\vanalysis\results\data\1388r.csv
ineqdeco eehewi [w=w], bygroup(pc) summarize
clear
log close
```

For rural urban share of each province

```
insheet using x:\phd\vanalysis\results\data\1388t.csv
ineqdeco eehewi [w=w] if pc==0, bygroup(ru)
```

Ethnic inequality

```
insheet using x:\phd\vanalysis\results\data\1389t.csv
ineqdeco eehewi [w=w], bygroup(ethnic)
```

Alpha general means

```
insheet using x:\phd\vanalysis\results\data\1386u.csv
gen eehewi1 = (eehewi^-5)
gen eehewi2 = eehewi1*w
egen eehewi3 = total(eehewi2)
egen totalw = total(w)
gen eehewi4 = (eehewi3/totalw)
gen eehewi5 = eehewi4^(1/-5)
```

```
cap run http://fmwww.bc.edu/repec/bocode/v/vallist.ado
vallist eehewi5, sort
clear
```

Weighted Average

```
insheet using x:\phd\vanalysis\results\data\1386u.csv
mean eehewi [pweight = w]
clear
```

Mean decile incomes

```
insheet using x:\phd\vanalysis\results\data\1386u.csv
xtile decile=eehewi[aw=w], n(10)
mean eehewi [pweight = w], over(decile)
```

Pen's Parade

```
view http://fmwww.bc.edu/repec/bocode/a/alorenz.hlp
view http://fmwww.bc.edu/repec/bocode/_/_pecats.hlp
cap run http://fmwww.bc.edu/repec/bocode/a/alorenz.ado
cap run http://fmwww.bc.edu/repec/bocode/_/_matchval.ado
cap run http://fmwww.bc.edu/repec/bocode/_/_pecats.ado
cap run http://fmwww.bc.edu/repec/bocode/_/_pecatsal.ado
cap run http://fmwww.bc.edu/repec/bocode/_/_ebin.ado
insheet using x:\phd\vanalysis\results\data\pentotal.csv
alorenz realeehewi [pw=w], by(year) points(100) view gp
```

Proportions to wealth graph

```
insheet using x:\phd\vanalysis\asset\final\finalrpc3.csv
xtile decile=pc1[aw=w], n(100)
total  motorbike [pweight=w], over(decile)
```

Appendix 4A Atkinson inequality measures, 1997 to 2010

The Atkinson index of inequality (Atkinson, 1975, p.48) results from the following formula:

$I = 1 - \left[\sum_{i=1}^{n} \left(\frac{Y_i}{\mu}\right)^{1-\varepsilon} f_i\right]^{\frac{1}{1-\varepsilon}}$

where

Y_i is the "income of those in the ith income range"

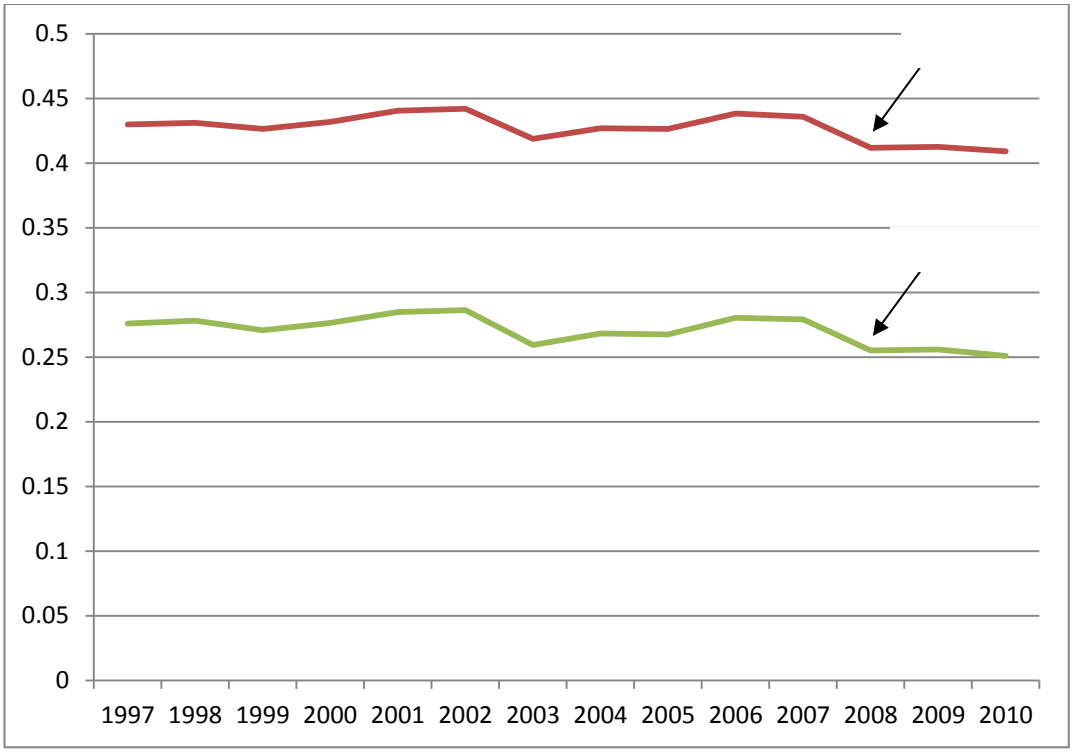
f_i is the "proportion of the population with incomes in the ith range"

μ is the "mean income"

ε is the "weight attached by society to inequality in the distribution", an inequality aversion paramater

Intuitively, the income inequality index reports what proportion of total income society would be willing to give up (depending on the society's inequality aversion) in order to achieve income equality and reap its associated aggregate social welfare gain. The results for household expenditures in Iran (urban and rural) follow the same pattern as the national GINI figure.

Year	ε = 0.5	ε = 1	ε = 2
1997	0.15268	0.27602	0.4865
1998	0.15176	0.27824	0.48477
1999	0.14913	0.27069	0.46636
2000	0.15246	0.27648	0.47528
2001	0.15916	0.2848	0.47705
2002	0.16012	0.28636	0.47833
2003	0.14328	0.25941	0.44079
2004	0.14862	0.26829	0.45387
2005	0.14785	0.26748	0.45208
2006	0.15496	0.28037	0.46842
2007	0.15489	0.27915	0.46872
2008	0.13829	0.25515	0.44672
2009	0.13788	0.25579	0.44992
2010	0.13707	0.25099	0.43696



It can be shown that the Atkinson index is a member of the General Entropy class of measures (Bellù and Liberati, 2006a) and hence it can also be decomposed into additive subgroups. For simplicity, in this study we only decompose the GE(1) measure and all decomposition results are based on this calculation.

Appendix 4B Mean urban : rural household expenditure (Equivalence Scale)

Year	Urban : Rural	National GINI
1997	2.02	0.42996
1998	1.98	0.43102
1999	1.94	0.42637
2000	2.02	0.43181
2001	2.13	0.44059
2002	2.15	0.44189
2003	2.00	0.41878
2004	1.94	0.4269
2005	2.00	0.42647
2006	2.04	0.43819
2007	2.10	0.43569

Appendix 4C Deflated urban and rural mean expenditures

(Not scaled for household size as we are interested in actual mean expenditure)

Year	Mean urban deflated	Mean rural deflated
1997	38,461,538	25,794,025
1998	40,697,674	26,689,052
1999	42,248,062	27,234,520
2000	43,470,790	26,802,975
2001	45,370,370	26,528,894
2002	48,400,000	28,391,256
2003	49,019,608	29,649,600
2004	53,600,000	34,400,000
2005	56,250,000	34,375,000
2006	56,761,134	33,919,039
2007	57,523,940	33,917,886
2008	52,918,712	30,114,566
2009	50,738,916	30,049,261
2010	51,270,815	30,631,025

Separate urban and rural CPI (constant 2004 prices) were used to compute the deflated expenditures. As no rural CPI figures were available for 2008-2010, the urban CPI was used for the rural sector for these three years.

Appendix 4D Regression of GINI on expenditure, urban: rural

Regression of GINI on average household expenditure (y), urban to rural ratio (UR)

Regression Statistics	
Multiple R	0.815012
R Square	0.664244
Adjusted R Square	0.520349
Standard Error	0.004848
Observations	11

ANOVA

	df	*SS*	*MS*	*F*
Regression	3	0.000326	0.000109	4.616164
Residual	7	0.000165	2.35E-05	
Total	10	0.00049		

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	20.8365	29.50564	0.706187	0.502892
ureehewi	0.082026	0.022126	3.707238	0.007582
y	-2.34385	3.364294	-0.69668	0.508468
y2	0.066759	0.095868	0.696365	0.508656

With the inclusion of (log of) government expenditure as a variable

Regression of GINI on average household expenditure (y), urban to rural ratio (UR), log Gov Expenditure

Regression Statistics	
Multiple R	0.815352
R Square	0.6648
Adjusted R Square	0.441333
Standard Error	0.005232
Observations	11

ANOVA

	df	*SS*	*MS*	*F*
Regression	4	0.000326	8.14E-05	2.974935
Residual	6	0.000164	2.74E-05	
Total	10	0.00049		

	Coefficients	*Standard*	*t Stat*	*P-value*

		Error		
Intercept	18.6332	38.76119	0.480718	0.647743
y	-2.10316	4.360243	-0.48235	0.64665
y2	0.059785	0.124896	0.478678	0.649112
ureehewi	0.079953	0.031661	2.525337	0.044962
log gov	0.005622	0.056394	0.099695	0.923834

Appendix 4E **Government final consumption expenditure & urban income share**

GVT EXP Final Consumption Government Expenditure constant 2000 $US

(Source: World Bank)

Urban Share Urban share of household equivalent expenditure

Year	Final Consumption Government Expenditure	Urban income share
1997	12,904,430,000.00	0.78436
1998	13,422,240,000.00	0.78135
1999	12,547,640,000.00	0.77753
2000	14,055,840,000.00	0.78463
2001	14,418,010,000.00	0.7925
2002	14,736,510,000.00	0.79475
2003	14,826,350,000.00	0.78303
2004	15,019,210,000.00	0.77736
2005	16,767,420,000.00	0.81293
2006	18,014,740,000.00	0.81612
2007	17,234,670,000.00	0.81985

Appendix 4F Regression of urban income share on government expenditure

Regression of urban income share on the log of final consumption government expenditure 1997-2007

Source	SS	df	MS	Number of obs	=	11
				F(1, 9)	=	28.72
Model	0.001918343	1	0.001918343	Prob > F	=	0.0005
Residual	0.000601212	9	0.000066801	R-squared	=	0.7614
				Adj R-squared	=	0.7349
Total	0.002519555	10	0.000251956	Root MSE	=	0.00817

ui	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
govlog	0.1185164	0.022116	5.36	0	0.0684864	0
_cons	-1.982365	0.517934	-3.83	0.004	-3.154014	-1

There is also a significant 0.88 correlation between final consumption government expenditure and the urban income share, suggesting that it favours the urban sector.

Appendix 4G GE measures for household equivalence expenditure, 1997-2009

Year	GINI	GE-1	GE0	GE1	GE2
1997	0.42996	0.47371	0.32299	0.34542	0.58642
1998	0.43102	0.47045	0.32606	0.33485	0.50357
1999	0.42637	0.43695	0.31565	0.33422	0.54025
2000	0.43181	0.45289	0.32363	0.34047	0.52669
2001	0.44059	0.45611	0.33519	0.3615	0.60519
2002	0.44189	0.45847	0.33737	0.36405	0.61293
2003	0.41878	0.39411	0.30031	0.32049	0.49718
2004	0.4269	0.41554	0.31237	0.33368	0.53334
2005	0.42647	0.41255	0.31126	0.33036	0.51186
2006	0.43819	0.4406	0.32901	0.34455	0.52317
2007	0.43569	0.44112	0.32733	0.34948	0.59754
2008	0.41189	0.4037	0.29458	0.30445	0.48408
2009	0.41258	0.40896	0.29543	0.29996	0.4424
2010	0.40906	0.38803	0.28901	0.30427	0.47708

Appendix 4H Top equivalence expenditure decile and the GINI coefficient

Year	Top decile	GINI
1997	32.9%	0.42996
1998	32.5%	0.43102
1999	32.5%	0.42637
2000	33.0%	0.43181
2001	34.0%	0.44059
2002	34.1%	0.44189
2003	32.3%	0.41878
2004	32.8%	0.4269
2005	32.6%	0.42647
2006	33.0%	0.43819
2007	33.0%	0.43569
2008	30.6%	0.41189
2009	30.6%	0.41258

Appendix 4I Urban and rural CPI table (constant 2004 prices)

Year	Urban CPI	Rural CPI
1997	36.4	33.6
1998	43.0	41.6
1999	51.6	51.4
2000	58.2	59.3
2001	64.8	66.0
2002	75.0	76.8
2003	86.7	88.0
2004	100.0	100.0
2005	110.4	112.0
2006	123.5	125.9
2007	146.2	147.4
2008	183.3	
2009	203.0	
2010	228.2	

The CBI was used as the source for the urban inflation rate and the SCI for the rural inflation rate.

Appendix 4J Decile expenditures, urban households 2007

Total expenditure Iranian Riyals	Deciles	% of expenditures
8,358,449,905,664	1	2.32%
13,193,284,943,872	2	3.66%
16,793,098,780,672	3	4.66%
20,289,591,181,312	4	5.63%
24,133,347,835,904	5	6.69%
28,900,040,114,176	6	8.01%
35,109,807,849,472	7	9.73%
43,407,619,653,632	8	12.03%
57,756,400,746,496	9	16.01%
112,759,257,694,208	10	31.26%

Appendix 4K Decile expenditures, rural households 2007

Total expenditure Iranian Riyals	Deciles	% of expenditures
1,946,404,126,720	1	2.46%
3,059,761,545,216	2	3.86%
3,864,490,934,272	3	4.88%
4,631,914,086,400	4	5.84%
5,450,801,086,464	5	6.88%
6,465,475,575,808	6	8.16%
7,754,504,732,672	7	9.78%
9,493,899,378,688	8	11.98%
12,522,985,881,600	9	15.80%
24,069,590,220,800	10	30.37%

Appendix 4L Total (urban & rural) household expenditure decile shares, 1997-2010

Year	Decile 1	Decile 2	Decile 3	Decile 4	Decile 5	Decile 6	Decile 7	Decile 8	Decile 9	Decile 10
1997	1.92%	3.31%	4.39%	5.45%	6.61%	7.93%	9.63%	11.92%	15.91%	32.93%
1998	1.84%	3.19%	4.32%	5.41%	6.63%	8.02%	9.75%	12.12%	16.26%	32.46%
1999	1.97%	3.32%	4.42%	5.48%	6.62%	7.98%	9.66%	12.02%	16.08%	32.45%
2000	1.93%	3.25%	4.33%	5.42%	6.61%	7.91%	9.55%	11.91%	16.12%	32.96%
2001	1.92%	3.21%	4.23%	5.30%	6.44%	7.77%	9.45%	11.74%	15.92%	34.02%
2002	1.90%	3.22%	4.25%	5.28%	6.39%	7.70%	9.39%	11.78%	16.03%	34.06%
2003	2.10%	3.50%	4.54%	5.57%	6.69%	7.95%	9.62%	11.90%	15.85%	32.29%
2004	2.05%	3.37%	4.41%	5.44%	6.56%	7.89%	9.56%	11.91%	16.02%	32.79%
2005	2.05%	3.37%	4.43%	5.45%	6.54%	7.85%	9.54%	11.92%	16.22%	32.62%
2006	1.97%	3.17%	4.18%	5.23%	6.37%	7.74%	9.54%	12.10%	16.65%	33.03%
2007	1.96%	3.21%	4.23%	5.29%	6.44%	7.78%	9.58%	12.17%	16.34%	32.99%
2008	2.04%	3.42%	4.50%	5.61%	6.80%	8.19%	9.93%	12.39%	16.47%	30.64%
2009	2.02%	3.42%	4.49%	5.55%	6.78%	8.18%	9.99%	12.42%	16.53%	30.60%
2010	2.12%	3.51%	4.59%	5.67%	6.84%	8.20%	9.88%	12.22%	16.12%	30.86%

Appendix 4M Fuel expenditure by household expenditure deciles

Aggregated fuel expenditure (in Iranian Riyals) by household expenditure deciles in urban areas, 2007

Deciles	2007 Urban	2007 Urban %
1	133,458,812,928	1.9%
2	278,026,452,992	4.0%
3	338,964,774,912	4.9%
4	374,766,829,568	5.4%
5	557,008,158,720	8.0%
6	576,109,346,816	8.3%
7	749,672,660,992	10.7%
8	922,621,509,632	13.2%
9	1,280,894,959,616	18.4%
10	1,766,344,097,792	25.3%

Appendix 4N Electricity expenditure by household expenditure deciles

Aggregated electricity expenditure (in Iranian Riyals) by household expenditure in urban areas, 2007

Deciles	2007 Urban	2007 Urban %
1	380,618,014,720	5.3%
2	519,312,834,560	7.2%
3	583,262,273,536	8.1%
4	583,806,025,728	8.1%
5	668,165,537,792	9.3%
6	720,437,837,824	10.0%
7	743,214,350,336	10.3%
8	832,066,879,488	11.5%
9	1,007,784,427,520	14.0%
10	1,175,027,712,000	16.3%

Appendix 4O Contribution to national inequality, urban and rural sectors, 1997-2009

Year	Urban contribution	Rural contribution	Between contribution	Income share urban	Pop share urban[107]	Income share rural	Pop share rural
1997	68%	18%	14%	78%	64%	22%	36%
1998	67%	20%	13%	78%	64%	22%	36%
1999	68%	19%	13%	78%	64%	22%	36%
2000	68%	18%	14%	78%	64%	22%	36%
2001	70%	15%	15%	79%	64%	21%	36%
2002	70%	15%	15%	79%	64%	21%	36%
2003	69%	17%	14%	78%	64%	22%	36%
2004	67%	20%	13%	78%	64%	22%	36%
2005	72%	15%	13%	81%	68%	19%	32%
2006	72%	15%	13%	82%	69%	18%	31%
2007	72%	15%	13%	82%	69%	18%	31%
2008	71%	14%	15%	84%	71%	16%	29%
2009	72%	14%	13%	85%	73%	15%	27%

[107] Please note that it is curious that between the calendar years of 1998-2004, using the weights and the raw household survey data provided by the SCI, the population share of the urban and rural sectors remain constant. There is a sudden adjustment in 2005 (sudden rise in the urban sector share). Much more likely is a gradual increase from 1998 to 2005.

Appendix 4P Contribution of provincial urban sectors to national inequality, 2007

Listed in order of contribution to inequality

Province	Contribution to overall inequality	Overall income share	Overall population share
Tehran	23.9%	30.5%	19.0%
Khorasan Razavi	5.9%	6.4%	5.5%
Esfahan	5.3%	7.0%	5.7%
Gilan	3.5%	2.8%	2.0%
Mazandaran	3.3%	3.2%	2.3%
Fars	3.1%	3.8%	3.6%
Azerbaijan East	2.9%	3.5%	3.6%
Khuzestan	2.0%	2.8%	3.4%
Azerbaijan West	1.9%	2.6%	2.3%
Hamedan	1.1%	1.5%	1.5%
Kerman	1.1%	1.7%	1.9%
Markazi	1.1%	1.5%	1.4%
Kermanshah	0.9%	1.7%	1.8%
Yazd	0.9%	1.0%	1.1%
Hormozgan	0.8%	1.0%	0.8%
Sistan and Baluchistan	0.6%	0.7%	1.3%
Golestan	0.6%	0.9%	1.1%
Qazvin	0.6%	1.3%	1.1%
Lorestan	0.6%	1.2%	1.3%
Ardabil	0.6%	1.0%	0.9%
Qom	0.5%	1.0%	1.4%
Zanjan	0.5%	0.8%	0.8%
Kurdistan	0.4%	0.9%	1.2%
Bushehr	0.4%	0.7%	0.7%
Khorasan North	0.3%	0.4%	0.5%
Ilam	0.3%	0.4%	0.4%
Kohgiluyeh and Boyer-Ahmad	0.3%	0.4%	0.3%
Semnan	0.3%	0.5%	0.7%
Khorasan South	0.2%	0.3%	0.4%
Chaharmahal and Bakhtiari	0.2%	0.5%	0.6%

Appendix 4Q National inequality composition, 2007

Between rural and urban provinces	13%
Within 30 rural provinces	13%
Between 30 rural provinces	2%
Between 30 urban provinces	8%
Tehran urban province	24%
Khorasan Razavi urban province	6%
Esfahan urban province	5%
27 other urban provinces	29%

Appendix 5A Provincial household expenditures, 1997-2010

Log mean provincial household expenditures, weighted total of urban and rural 1997-2010

Province	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Markazi	15.00	15.25	15.53	15.67	15.97	16.30	16.44	16.57	16.65	16.79	17.07	17.02	17.33	17.55
Gilan	15.11	15.38	15.71	15.90	16.07	16.05	16.20	16.61	16.70	16.96	17.19	17.29	17.40	17.47
Mazandaran	15.08	15.44	15.68	15.94	15.97	16.26	16.43	16.78	17.01	17.14	17.31	17.33	17.34	17.61
Azerbaijan E	15.18	15.47	15.65	15.82	15.85	16.14	16.30	16.62	16.72	16.88	17.00	17.29	17.40	17.51
Azerbaijan W	14.93	15.10	15.41	15.57	15.80	16.04	16.31	16.65	16.80	16.95	17.16	17.28	17.34	17.54
Kermanshah	15.11	15.20	15.38	15.62	15.79	16.16	16.33	16.42	16.51	16.76	16.99	17.14	17.26	17.51
Khuzestan	15.15	15.47	15.42	15.70	15.84	16.03	16.13	16.47	16.58	16.74	16.84	17.24	17.40	17.48
Fars	15.34	15.50	15.71	15.86	15.88	16.09	16.28	16.62	16.89	16.89	17.09	17.27	17.53	17.81
Kerman	14.95	15.20	15.69	15.81	15.88	16.12	16.37	16.59	16.67	16.73	16.85	17.12	17.05	17.30
Khorasan Raz	15.03	15.30	15.64	15.68	15.73	15.93	16.11	16.37	16.71	16.79	17.12	17.19	17.26	17.40
Esfahan	15.24	15.41	15.64	15.87	16.01	16.22	16.42	16.81	16.96	17.15	17.34	17.44	17.60	17.73
Sistan & Bal	14.69	14.97	15.19	15.39	15.41	15.58	15.76	16.06	16.25	16.32	16.36	16.46	16.48	16.76
Kurdistan	14.80	15.03	15.02	15.52	15.55	15.92	16.25	16.44	16.60	16.59	16.80	17.01	17.26	17.36
Hamedan	14.96	15.18	15.37	15.49	15.72	16.03	16.32	16.40	16.54	16.62	16.91	16.96	17.12	17.39
Chaharmahal	14.96	15.12	15.22	15.38	15.48	15.60	15.83	16.31	16.47	16.75	16.77	17.04	17.20	17.43
Lorestan	14.98	15.14	15.45	15.69	15.79	16.02	16.21	16.49	16.64	16.77	16.85	17.23	17.37	17.34
Ilam	15.25	14.99	15.71	15.88	15.99	16.28	16.62	16.76	16.85	16.93	17.07	17.21	17.32	17.26
Kohgiluyeh	14.70	15.35	15.30	15.37	15.71	15.91	16.07	16.48	16.57	16.66	16.90	16.80	16.97	17.37
Bushehr	14.99	15.13	15.58	15.63	15.84	16.13	16.58	16.73	16.84	16.90	17.08	17.24	17.37	17.34
Zanjan	14.74	14.92	15.21	15.48	15.80	16.22	16.26	16.29	16.53	16.72	16.96	17.28	17.24	17.47
Semnan	15.26	15.38	15.60	15.54	15.80	15.98	16.12	16.45	16.61	16.78	16.88	17.14	17.33	17.41
Yazd	15.35	15.61	15.80	15.86	15.96	16.20	16.23	16.32	16.61	16.78	17.04	17.05	17.12	17.39
Hormozgan	15.13	15.55	15.48	15.58	15.90	16.02	16.24	16.72	16.82	17.05	17.10	17.02	17.16	17.19
Tehran	15.76	16.00	16.21	16.38	16.57	16.85	16.96	17.13	17.25	17.40	17.63	17.78	17.80	17.89
Ardabil	15.27	15.39	15.52	15.93	16.09	16.19	16.49	16.77	16.89	16.94	17.11	17.29	17.37	17.58
Qom	15.37	15.49	15.68	15.81	16.04	16.22	16.31	16.52	16.63	16.74	16.81	17.06	17.17	17.35
Qazvin		15.43	15.69	15.81	16.02	16.13	16.42	16.81	16.99	17.11	17.24	17.48	17.37	17.45
Golestan		14.96	15.44	15.74	15.74	15.89	16.07	16.23	16.46	16.60	16.73	16.93	17.07	17.27
Khorasan N									16.22	16.39	16.63	16.92	17.03	17.18
Khorasan S									16.43	16.50	16.62	16.74	16.78	17.12

Appendix 5B Provincial urban household expenditures, 1997-2010

Log mean provincial household expenditures, urban 1997-2010

Province	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Markazi	15.2	15.5	15.7	15.9	16.2	16.5	16.6	16.8	16.8	17	17.3	17.2	17.5	17.7
Gilan	15.3	15.5	15.9	16.1	16.3	16.3	16.4	16.8	16.9	17.2	17.5	17.5	17.6	17.7
Mazandaran	15.3	15.6	15.8	16.1	16.1	16.5	16.6	17	17.2	17.3	17.5	17.5	17.5	17.8
Azerbaijan East	15.3	15.6	15.8	16	16	16.3	16.5	16.8	16.9	17.1	17.2	17.4	17.5	17.6
Azerbaijan West	15.1	15.3	15.6	15.8	16	16.3	16.6	16.9	17	17.1	17.3	17.4	17.5	17.7
Kermanshah	15.2	15.3	15.5	15.8	16	16.3	16.5	16.6	16.7	16.9	17.1	17.3	17.4	17.6
Khuzestan	15.3	15.6	15.5	15.9	16	16.2	16.2	16.6	16.7	16.9	17	17.4	17.5	17.6
Fars	15.6	15.6	15.9	16.1	16.1	16.3	16.5	16.8	17.1	17.1	17.2	17.4	17.7	18
Kerman	15.1	15.4	15.9	16.1	16.1	16.3	16.6	16.8	16.9	17	17.1	17.4	17.2	17.5
Khorasan Razavi	15.3	15.6	15.9	15.9	16	16.2	16.4	16.6	16.9	17	17.3	17.4	17.4	17.6
Esfahan	15.3	15.5	15.8	16	16.1	16.3	16.5	16.9	17	17.2	17.4	17.5	17.7	17.8
Sistan & Baluch	15	15.3	15.5	15.7	15.8	15.9	16.1	16.4	16.5	16.6	16.7	16.8	16.8	17.1
Kurdistan	14.9	15.3	15.3	15.8	15.8	16.2	16.5	16.7	16.8	16.8	17	17.2	17.4	17.5
Hamedan	15.2	15.5	15.7	15.8	15.9	16.3	16.5	16.6	16.7	16.8	17.2	17.2	17.3	17.6
Chaharmahal	15.2	15.4	15.5	15.7	15.8	15.9	16.1	16.6	16.7	17	17	17.3	17.4	17.6
Lorestan	15.2	15.3	15.6	15.9	16	16.2	16.4	16.7	16.8	17	17.1	17.5	17.6	17.6
Ilam	15.5	15.1	15.9	16.1	16.2	16.5	16.8	17	17	17.1	17.3	17.4	17.5	17.4
Kohgiluyeh	15	15.6	15.7	15.7	16.1	16.3	16.5	16.9	16.9	17	17.3	17.2	17.3	17.7
Bushehr	15.2	15.3	15.7	15.8	16	16.3	16.8	16.9	17	17	17.2	17.3	17.5	17.5
Zanjan	14.9	15.2	15.5	15.8	16.1	16.5	16.5	16.6	16.8	17	17.2	17.5	17.4	17.6
Semnan	15.4	15.5	15.7	15.7	15.9	16.1	16.3	16.6	16.7	16.9	17	17.2	17.4	17.5
Yazd	15.4	15.7	15.9	15.9	16	16.3	16.3	16.4	16.7	16.8	17.1	17.1	17.2	17.4
Hormozgan	15.5	15.9	15.8	15.9	16.3	16.4	16.6	17.1	17.2	17.4	17.4	17.3	17.5	17.5
Tehran	15.8	16.1	16.3	16.4	16.6	16.9	17	17.2	17.3	17.4	17.7	17.8	17.8	17.9
Ardabil	15.4	15.5	15.7	16.1	16.3	16.3	16.7	16.9	17.1	17.1	17.3	17.5	17.5	17.7
Qom	15.4	15.5	15.7	15.8	16.1	16.3	16.3	16.6	16.7	16.8	16.8	17.1	17.2	17.4
Qazvin		15.6	15.9	16	16.2	16.3	16.6	17	17.2	17.3	17.4	17.6	17.5	17.6
Golestan		15.2	15.7	16	16.1	16.2	16.4	16.6	16.8	16.9	17	17.3	17.3	17.6
Khorasan North									16.5	16.7	17	17.3	17.3	17.5
Khorasan South									16.8	16.9	17	17.1	17.1	17.4

Appendix 5C Provincial rural household expenditures, 1997-2010

Log provincial mean household expenditures, rural 1997-2010

Province	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Markazi	14.7	14.9	15.2	15.3	15.5	16	16.1	16.2	16.2	16.3	16.5	16.6	16.6	17
Gilan	14.9	15.2	15.5	15.7	15.8	15.8	15.9	16.4	16.4	16.6	16.7	16.9	17	17.1
Mazandaran	14.8	15.3	15.6	15.8	15.8	16	16.3	16.6	16.7	16.9	17	17	17.1	17.3
Azerbaijan East	14.8	15.1	15.3	15.4	15.5	15.7	15.8	16.3	16.3	16.4	16.6	16.9	17	17.1
Azerbaijan West	14.6	14.8	15.1	15.1	15.4	15.6	15.8	16.2	16.4	16.5	16.8	16.9	17	17.2
Kermanshah	14.8	14.9	15.2	15.2	15.3	15.8	16	16	16.1	16.3	16.6	16.7	16.8	17.1
Khuzestan	14.8	15	15.1	15.3	15.4	15.7	15.9	16	16.1	16.3	16.3	16.8	17	16.9
Fars	14.9	15.2	15.4	15.5	15.5	15.8	16	16.3	16.4	16.5	16.8	16.8	17.2	17.4
Kerman	14.7	14.9	15.3	15.4	15.6	15.8	16	16.3	16.3	16.3	16.4	16.5	16.7	16.9
Khorasan Razavi	14.5	14.8	15.2	15.2	15.1	15.4	15.7	15.9	16.1	16.2	16.5	16.6	16.6	16.8
Esfahan	14.9	15	15.2	15.4	15.6	15.9	16.1	16.4	16.7	16.8	17	17.1	17.2	17.3
Sistan & Baluch	14.4	14.6	14.8	14.9	14.9	15.2	15.3	15.7	15.9	15.9	16	15.9	16	16.2
Kurdistan	14.6	14.6	14.6	15.1	15.2	15.5	15.9	16	16.3	16.2	16.5	16.6	16.9	17
Hamedan	14.6	14.7	14.9	15.1	15.4	15.7	16	16.1	16.2	16.3	16.4	16.5	16.7	16.9
Chaharmahal	14.7	14.7	14.9	15	15.1	15.3	15.5	16	16.1	16.3	16.5	16.7	16.9	17.1
Lorestan	14.6	14.8	15.2	15.4	15.4	15.6	15.9	16.2	16.3	16.4	16.4	16.6	16.8	16.7
Ilam	14.7	14.7	15.4	15.5	15.6	15.8	16.2	16.4	16.5	16.5	16.6	16.8	16.9	16.9
Kohgiluyeh	14.5	15.1	14.9	15.1	15.4	15.5	15.7	16.1	16.1	16.2	16.4	16.2	16.4	16.8
Bushehr	14.7	14.8	15.3	15.4	15.6	15.9	16.3	16.4	16.6	16.6	16.8	17	17	17
Zanjan	14.5	14.5	14.8	15	15.4	15.8	15.9	15.9	16	16.3	16.4	16.8	16.8	17.2
Semnan	15	15	15.3	15.2	15.4	15.6	15.7	16	16.2	16.3	16.5	16.8	16.9	17
Yazd	15.2	15.1	15.5	15.6	15.7	15.8	16	16.1	16.4	16.5	16.7	16.8	16.9	17.1
Hormozgan	14.7	15.1	15.2	15.2	15.4	15.6	15.8	16.3	16.3	16.6	16.7	16.6	16.7	16.6
Tehran	15.1	15.4	15.6	15.7	15.8	16.1	16.3	16.5	16.7	16.8	17	17.1	17	17.1
Ardabil	15.1	15.2	15.3	15.6	15.8	16	16.3	16.6	16.6	16.6	16.8	17	17	17.3
Qom	15.2	15.4	15.5	15.5	15.6	15.8	15.9	16	16.2	16.4	16.5	16.8	16.7	17.1
Qazvin		15.2	15.3	15.6	15.7	15.8	16.1	16.5	16.6	16.8	17	17.1	17	17.1
Golestan		14.6	15.1	15.4	15.4	15.5	15.6	15.9	16	16.2	16.4	16.4	16.6	16.8
Khorasan North									15.9	16	16.2	16.4	16.5	16.7
Khorasan South									16	16	16.1	16.2	16.3	16.6

Appendix 5D Mean provincial household expenditures, 2010

Annual mean provincial household expenditures (not scaled for household size) Riyals, 2010

Province	Mean expenditure
Markazi	100,000,000
Gilan	91,100,000
Mazandaran	110,000,000
Azerbaijan East	98,800,000
Azerbaijan West	113,000,000
Kermanshah	103,000,000
Khuzestan	108,000,000
Fars	136,000,000
Kerman	81,000,000
Khorasan Razavi	86,500,000
Esfahan	113,000,000
Sistan and Baluchistan	54,600,000
Kurdistan	87,700,000
Hamedan	87,900,000
Chaharmahal and Bakhtiari	94,500,000
Lorestan	90,100,000
Ilam	93,000,000
Kohgiluyeh and Boyer-Ahmad	103,000,000
Bushehr	89,000,000
Zanjan	97,900,000
Semnan	84,500,000
Yazd	85,000,000
Hormozgan	76,100,000
Tehran	129,000,000
Ardabil	111,000,000
Qom	85,400,000
Qazvin	93,900,000
Golestan	81,000,000
Khorasan North	70,500,000
Khorasan South	65,100,000

Appendix 5E Provincial GDP/capita with and without oil, 2007

Provinces	GDP/capita including oil	GDP/capita non-oil
Kohgiluyeh	143,628,599	18,623,304
Khuzestan	114,018,346	34,711,354
Bushehr	76,694,476	41,766,100
Ilam	69,767,762	21,119,351
Tehran	56,601,719	56,054,705
Markazi	44,057,837	41,776,513
Esfahan	40,961,482	38,563,572
Yazd	38,826,515	38,802,736
Semnan	38,668,886	37,965,147
Hormozgan	35,432,639	32,658,939
Qazvin	33,947,556	33,900,148
Mazandaran	32,268,919	32,147,907
Kerman	31,320,088	31,278,627
Fars	28,580,500	26,497,123
Azerbaijan East	28,239,158	27,693,359
Gilan	26,222,963	26,028,020
Qom	25,613,500	25,381,937
Khorasan Razavi	25,568,730	25,483,315
Zanjan	25,243,538	25,085,630
Hamedan	24,621,568	24,614,516
Khorasan South	24,168,037	24,168,037
Khorasan North	23,458,653	23,458,653
Ardabil	22,285,768	22,279,271
Golestan	22,111,132	22,095,220
Kermanshah	22,032,115	21,830,550
Chaharmahal and Bakhtiari	20,752,456	20,715,520
Lorestan	19,067,348	18,906,310
Kurdistan	19,054,140	19,051,375
Azerbaijan West	19,015,977	19,009,100
Sistan and Baluchistan	11,095,335	11,099,758

Appendix 5F Provincial rural & urban expenditure share

Sorted by mean expenditure

Province	Urban population share	Rural population Share	Urban expenditure share	Rural expenditure Share
Sistan and Baluchistan	51%	49%	73%	27%
Khorasan South	54%	46%	72%	28%
Khorasan North	52%	48%	70%	30%
Hormozgan	53%	47%	73%	27%
Ilam	66%	34%	76%	24%
Golestan	55%	45%	73%	27%
Kerman	63%	37%	75%	25%
Lorestan	65%	35%	81%	19%
Bushehr	71%	29%	79%	21%
Qom	95%	5%	96%	4%
Kurdistan	65%	35%	75%	25%
Kohgiluyeh and Boyer-Ahmad	51%	49%	73%	27%
Hamedan	63%	37%	78%	22%
Yazd	82%	18%	87%	13%
Khorasan Razavi	72%	28%	84%	16%
Semnan	78%	22%	85%	15%
Chaharmahal and Bakhtiari	57%	43%	70%	30%
Qazvin	72%	28%	80%	20%
Zanjan	64%	36%	72%	28%
Gilan	58%	42%	70%	30%
Khuzestan	73%	27%	85%	15%
Kermanshah	72%	28%	82%	18%
Azerbaijan East	72%	28%	82%	18%
Azerbaijan West	67%	33%	77%	23%
Markazi	72%	28%	83%	17%
Ardabil	64%	36%	73%	27%
Mazandaran	57%	43%	68%	32%
Esfahan	85%	15%	90%	10%
Fars	66%	34%	78%	22%
Tehran	93%	7%	97%	3%

Appendix 5H Provincial rankings by household expenditure 2005-2010

Provincial expenditure rank	2005	2006	2007	2008	2009	2010
1	Tehran	Tehran	Tehran	Tehran	Tehran	Tehran
2	Mazandaran	Esfahan	Esfahan	Qazvin	Esfahan	Fars
3	Qazvin	Mazandaran	Mazandaran	Esfahan	Fars	Esfahan
4	Esfahan	Qazvin	Qazvin	Mazandaran	Gilan	Mazandaran
5	Ardabil	Hormozgan	Gilan	Azerbaijan East	Azerbaijan East	Ardabil
6	Fars	Gilan	Azerbaijan West	Gilan	Khuzestan	Markazi
7	Ilam	Azerbaijan West	Khorasan Razavi	Ardabil	Bushehr	Azerbaijan West
8	Bushehr	Ardabil	Ardabil	Azerbaijan West	Lorestan	Azerbaijan East
9	Hormozgan	Ilam	Hormozgan	Zanjan	Ardabil	Kermanshah
10	Azerbaijan West	Bushehr	Fars	Fars	Qazvin	Khuzestan
11	Azerbaijan East	Fars	Bushehr	Bushehr	Mazandaran	Gilan
12	Khorasan Razavi	Azerbaijan East	Markazi	Khuzestan	Azerbaijan West	Zanjan
13	Gilan	Markazi	Ilam	Lorestan	Semnan	Qazvin
14	Kerman	Khorasan Razavi	Yazd	Ilam	Markazi	Chaharmahal and Bakhtiari
15	Markazi	Yazd	Azerbaijan East	Khorasan Razavi	Ilam	Semnan
16	Lorestan	Semnan	Kermanshah	Kermanshah	Kurdistan	Khorasan Razavi
17	Qom	Lorestan	Zanjan	Semnan	Khorasan Razavi	Yazd
18	Yazd	Kermanshah	Hamedan	Kerman	Kermanshah	Hamedan
19	Semnan	Chaharmahal and Bakhtiari	Kohgiluyeh and Boyer-Ahmad	Qom	Zanjan	Kohgiluyeh and Boyer-Ahmad
20	Kurdistan	Qom	Semnan	Yazd	Chaharmahal and Bakhtiari	Kurdistan
21	Khuzestan	Khuzestan	Lorestan	Chaharmahal and Bakhtiari	Qom	Qom
22	Kohgiluyeh and Boyer-Ahmad	Kerman	Kerman	Hormozgan	Hormozgan	Bushehr
23	Hamedan	Zanjan	Khuzestan	Markazi	Yazd	Lorestan
24	Zanjan	Kohgiluyeh and Boyer-Ahmad	Qom	Kurdistan	Hamedan	Kerman
25	Kermanshah	Hamedan	Kurdistan	Hamedan	Golestan	Golestan
26	Chaharmahal and Bakhtiari	Golestan	Chaharmahal and Bakhtiari	Golestan	Kerman	Ilam
27	Golestan	Kurdistan	Golestan	Khorasan North	Khorasan North	Hormozgan
28	Khorasan South	Khorasan South	Khorasan North	Kohgiluyeh and Boyer-Ahmad	Kohgiluyeh and Boyer-Ahmad	Khorasan North
29	Sistan and Baluchistan	Khorasan North	Khorasan South	Khorasan South	Khorasan South	Khorasan South
30	Khorasan North	Sistan and Baluchistan	Sistan and Baluchistan	Sistan and Baluchistan	Sistan and Baluchistan	Sistan and Baluchistan

Appendix 5l Tehran : Sistan and Baluchistan mean household expenditure ratio

Weighted total of rural and urban, scaled for household size

Rural and Urban	Sistan and Baluchistan	Tehran	Ratio
1990	385,488	1,166,150	3.03
…	…	…	…
1997	2,388,601	7,006,055	2.93
1998	3,164,400	8,912,974	2.82
1999	3,945,600	11,001,928	2.79
2000	4,807,596	12,978,586	2.70
2001	4,927,978	15,758,003	3.20
2002	5,848,687	20,698,716	3.54
2003	6,999,590	23,153,029	3.31
2004	9,392,633	27,578,382	2.94
2005	11,404,495	31,168,492	2.73
2006	12,187,079	36,008,732	2.95
2007	12,782,152	45,149,088	3.53
2008	14,102,456	52,881,527	3.75
2009	14,328,158	53,595,615	3.74
2010	18,994,661	58,983,521	3.11

Appendix 5J Regression of sigma on GDP growth rate, 1997-2010

$\sigma_i = b_0 + b_1 x_i + u_i$

Source	SS	df MS		Number of obs	14
				F(1, 12)	0.01
Model	1.39E-06	1 1.3923e-06		Prob > F	0.9203
Residual	0.001600631	12 .000133386		R-squared	0.0009
				Adj R-squared	-0.0824
Total	0.001602023	13 .000123233		Root MSE	0.01155
sigmanatio~l	Coef.	Std. Err. t	P>t	[95% Conf.	Interval]
gdpgrowth	0.0001262	.0012349 0.10	0.92	-0.0025644	0.002817
_cons	0.230736	.0065344 35.31	0	0.2164988	0.244973

Appendix 5K Regression of sigma on GDP growth rate, 2000-2010

$\sigma = b_0 + b_1 x + u$

Source	SS	df MS		Number of obs	8
				F(1, 6)	61.64
Model	0.00058	1 .000579962		Prob > F	0.0002
Residual	5.65E-05	6 9.4086e-06		R-squared	0.9113
				Adj R-squared	0.8965
Total	0.000636	7 .000090916		Root MSE	0.00307
sigmanatio~l	Coef.	Std. Err. t	P>t	[95% Conf.	Interval]
gdpgrowth	0.004065	.0005177 7.85	0	0.002798	0.005332
_cons	0.202283	.0034043 59.42	0	0.193953	0.210613

Appendix 6A Provincial GINI figures 1997-2010

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Markazi	0.34	0.38	0.40	0.41	0.42	0.37	0.38	0.43	0.39	0.41	0.44	0.38	0.44	0.43
Gilan	0.38	0.43	0.39	0.40	0.40	0.37	0.38	0.36	0.40	0.43	0.45	0.39	0.41	0.37
Mazandaran	0.43	0.41	0.38	0.39	0.39	0.38	0.36	0.41	0.42	0.42	0.41	0.38	0.35	0.37
Azerbaijan East	0.39	0.41	0.39	0.42	0.41	0.43	0.40	0.41	0.39	0.43	0.41	0.42	0.38	0.38
Azerbaijan West	0.38	0.36	0.37	0.38	0.39	0.41	0.41	0.41	0.40	0.40	0.40	0.39	0.38	0.37
Kermanshah	0.30	0.34	0.35	0.38	0.41	0.40	0.38	0.41	0.39	0.43	0.36	0.38	0.38	0.39
Khuzestan	0.35	0.38	0.34	0.36	0.33	0.30	0.27	0.36	0.38	0.40	0.37	0.35	0.38	0.39
Fars	0.41	0.39	0.39	0.40	0.37	0.37	0.35	0.38	0.41	0.39	0.41	0.36	0.39	0.42
Kerman	0.41	0.39	0.45	0.42	0.41	0.41	0.43	0.43	0.42	0.43	0.41	0.44	0.41	0.40
Khorasan Razavi	0.43	0.46	0.42	0.43	0.44	0.46	0.43	0.44	0.45	0.45	0.46	0.41	0.43	0.40
Esfahan	0.41	0.40	0.40	0.40	0.42	0.39	0.36	0.41	0.41	0.40	0.40	0.37	0.37	0.37
Sistan and Baluchistan	0.37	0.41	0.43	0.45	0.46	0.46	0.46	0.43	0.41	0.41	0.43	0.46	0.47	0.48
Kurdistan	0.31	0.38	0.38	0.41	0.37	0.39	0.37	0.37	0.38	0.35	0.33	0.35	0.36	0.33
Hamedan	0.40	0.44	0.45	0.45	0.40	0.38	0.37	0.39	0.40	0.41	0.44	0.35	0.39	0.41
Chaharmahal & Bakhtiari	0.40	0.41	0.37	0.38	0.37	0.36	0.35	0.31	0.35	0.38	0.29	0.31	0.36	0.37
Lorestan	0.34	0.35	0.35	0.35	0.36	0.37	0.33	0.32	0.36	0.39	0.35	0.41	0.40	0.42
Ilam	0.42	0.35	0.41	0.35	0.38	0.41	0.38	0.39	0.38	0.39	0.39	0.36	0.36	0.36
Kohgiluyeh & Boyer.	0.45	0.37	0.46	0.43	0.43	0.42	0.40	0.45	0.44	0.48	0.46	0.42	0.49	0.44
Bushehr	0.31	0.34	0.39	0.36	0.36	0.36	0.43	0.37	0.34	0.36	0.34	0.31	0.35	0.37
Zanjan	0.42	0.40	0.45	0.46	0.42	0.42	0.38	0.40	0.39	0.38	0.41	0.40	0.37	0.33
Semnan	0.41	0.34	0.34	0.34	0.35	0.31	0.33	0.36	0.35	0.38	0.34	0.35	0.39	0.36
Yazd	0.44	0.46	0.41	0.38	0.39	0.40	0.34	0.32	0.38	0.37	0.41	0.36	0.35	0.37
Hormozgan	0.42	0.46	0.39	0.36	0.44	0.41	0.41	0.46	0.45	0.46	0.45	0.45	0.42	0.42
Tehran	0.41	0.38	0.39	0.41	0.42	0.42	0.39	0.39	0.39	0.41	0.40	0.35	0.37	0.39
Ardabil	0.40	0.36	0.37	0.41	0.41	0.36	0.41	0.40	0.39	0.41	0.37	0.40	0.37	0.38
Qom	0.35	0.31	0.31	0.29	0.43	0.33	0.29	0.37	0.35	0.38	0.33	0.34	0.34	0.32
Qazvin		0.39	0.41	0.40	0.38	0.37	0.36	0.36	0.37	0.37	0.35	0.36	0.32	0.34
Golestan		0.41	0.44	0.47	0.46	0.46	0.46	0.47	0.46	0.45	0.42	0.46	0.44	0.45
Khorasan North									0.40	0.43	0.44	0.43	0.43	0.42
Khorasan South									0.44	0.43	0.44	0.39	0.36	0.40

Appendix 6B STATA output, correlation between provincial GINI figures, 1998-2010

Only figures with an asterix * are significant at the 5% level

	markazi	gilan	mazand~n	azer~ast	azer~est	kerman~h	khuzes~n
markazi	1.0000						
gilan	0.1507	1.0000					
	0.6230						
mazandaran	-0.0541	0.3862	1.0000				
	0.8607	0.1924					
azerbaij~ast	-0.3181	0.2221	0.5233	1.0000			
	0.2896	0.4657	0.0665				
azerbaij~est	-0.0849	-0.2318	0.1577	0.3993	1.0000		
	0.7827	0.4460	0.6068	0.1765			
kermanshah	0.1712	-0.3274	0.1682	0.3739	0.5937*	1.0000	
	0.5760	0.2749	0.5829	0.2082	0.0324		
khuzestan	0.5175	0.4021	0.3771	-0.1084	-0.4673	-0.0022	1.0000
	0.0701	0.1732	0.2041	0.7245	0.1073	0.9944	
fars	0.5085	0.3037	0.3209	-0.3219	-0.4461	-0.2157	0.7342*
	0.0760	0.3130	0.2850	0.2834	0.1266	0.4791	0.0043
kerman	-0.1669	-0.2131	-0.0405	0.0929	0.2720	0.0615	-0.2331
	0.5858	0.4845	0.8955	0.7628	0.3687	0.8418	0.4435
khorasanra~i	-0.1100	0.4261	0.6349*	0.4826	0.3711	0.1668	-0.0249
	0.7204	0.1466	0.0197	0.0948	0.2119	0.5859	0.9358
esfahan	0.0981	0.1230	0.7485*	0.4580	0.0150	0.2497	0.2392
	0.7497	0.6890	0.0032	0.1155	0.9611	0.4106	0.4313
sistanandb~n	0.1464	-0.4864	-0.8635*	-0.3185	0.0212	0.1291	-0.3648
	0.6333	0.0919	0.0001	0.2888	0.9452	0.6743	0.2203
kurdistan	-0.4237	-0.3288	-0.0158	0.1526	0.0170	-0.0173	-0.4027
	0.1490	0.2727	0.9592	0.6187	0.9559	0.9553	0.1725
hamedan	0.3164	0.4625	0.3441	-0.0526	-0.5984*	-0.4417	0.3753
	0.2923	0.1116	0.2496	0.8645	0.0307	0.1308	0.2064
chaharmaha~i	-0.2416	0.0768	-0.0009	-0.1146	-0.6704*	-0.1300	0.1526
	0.4264	0.8031	0.9978	0.7092	0.0122	0.6721	0.6186
lorestan	0.0569	-0.0068	-0.4106	-0.1918	-0.3250	0.0957	0.3991
	0.8536	0.9825	0.1634	0.5302	0.2786	0.7558	0.1768
ilam	-0.1053	-0.1085	0.2180	0.2951	0.5562*	0.3191	-0.3813
	0.7320	0.7243	0.4743	0.3276	0.0484	0.2880	0.1986
kohgiluyeh~d	0.6624*	0.1122	-0.0853	-0.1443	0.1800	0.3653	0.3934
	0.0136	0.7152	0.7818	0.6382	0.5563	0.2196	0.1836
bushehr	-0.0099	-0.3562	-0.2821	-0.2191	0.1754	0.0846	-0.5805*
	0.9745	0.2323	0.3504	0.4721	0.5666	0.7834	0.0375
zanjan	-0.2767	0.0717	0.1957	0.4204	0.0156	-0.2242	-0.3505
	0.3601	0.8159	0.5216	0.1526	0.9598	0.4616	0.2403
semnan	0.6053*	0.1514	-0.0756	-0.3181	-0.2364	0.2240	0.7292*
	0.0284	0.6215	0.8061	0.2895	0.4368	0.4619	0.0047
yazd	-0.3062	0.5301	0.3474	0.1592	-0.5366	-0.5572*	0.1284

```
        |  0.3090  0.0624  0.2449  0.6035  0.0587  0.0479  0.6759
        |
  hormozgan |  0.0435  0.3295  0.5413  0.2511  0.2160  0.1937  0.4051
        |  0.8878  0.2716  0.0561  0.4079  0.4785  0.5260  0.1697
        |
    tehran |  0.0330  0.0271  0.3386  0.4207  0.2314  0.4554 -0.2449
        |  0.9148  0.9299  0.2578  0.1523  0.4468  0.1178  0.4199
        |
   ardabil |  0.0666 -0.2599  0.0697  0.1789  0.3829  0.6179* -0.1354
        |  0.8289  0.3912  0.8211  0.5587  0.1966  0.0244  0.6592
        |
      qom |  0.2929  0.0427  0.2997  0.2774  0.2547  0.6879*  0.2810
        |  0.3314  0.8897  0.3198  0.3588  0.4010  0.0094  0.3524
        |
    qazvin |  -0.4275  0.0556  0.4381  0.3554 -0.2504 -0.2418 -0.1861
        |  0.1451  0.8569  0.1343  0.2334  0.4093  0.4261  0.5427
        |
  golestan |  -0.0160 -0.6939* -0.1423  0.1167  0.5723*  0.7193* -0.3311
        |  0.9586  0.0085  0.6429  0.7043  0.0410  0.0056  0.2692
        |
        |    fars   kerman khoras~i  esfahan sistan~n kurdis~n  hamedan
-------------+------------------------------------------------------------------
      fars |   1.0000
        |
        |
    kerman |  -0.3637   1.0000
        |  0.2219
        |
khorasanra~i |   0.0339  -0.3478   1.0000
        |  0.9123   0.2442
        |
   esfahan |   0.2250  -0.1319   0.5516   1.0000
        |  0.4598   0.6674   0.0507
        |
sistanandb~n |  -0.2563  -0.1726  -0.5751* -0.5892*  1.0000
        |  0.3979   0.5729   0.0397   0.0341
        |
  kurdistan |  -0.2379   0.1301   0.1878   0.3232  -0.1167   1.0000
        |  0.4337   0.6719   0.5389   0.2814   0.7042
        |
   hamedan |   0.6381* -0.1517   0.1565   0.4631  -0.4240   0.1220   1.0000
        |  0.0189   0.6209   0.6097   0.1111   0.1488   0.6913
        |
chaharmaha~i |   0.1388  -0.2769   0.0247   0.1657  -0.1400   0.4049   0.4312
        |  0.6511   0.3597   0.9361   0.5885   0.6483   0.1699   0.1413
        |
  lorestan |   0.1912  -0.1017  -0.5125  -0.4924   0.4487  -0.4454  -0.2683
        |  0.5314   0.7409   0.0733   0.0874   0.1241   0.1272   0.3754
        |
     ilam |  -0.2300   0.4598   0.3685   0.2185  -0.2105   0.0337  -0.0493
        |  0.4496   0.1139   0.2154   0.4732   0.4901   0.9130   0.8730
        |
kohgiluyeh~d |   0.3182   0.3356  -0.1125  -0.0983   0.0496  -0.3372   0.0514
        |  0.2893   0.2623   0.7143   0.7493   0.8720   0.2598   0.8677
        |
   bushehr |  -0.3198   0.2481  -0.0839  -0.2153   0.1985   0.2471   0.0486
        |  0.2868   0.4137   0.7853   0.4800   0.5155   0.4157   0.8748
        |
    zanjan |  -0.1673   0.3711   0.1726   0.4872  -0.2797   0.6439*  0.4090
        |  0.5848   0.2118   0.5729   0.0913   0.3546   0.0175   0.1653
        |
    semnan |   0.2980   0.0657  -0.2398  -0.0947  -0.0562  -0.2990  -0.0127
        |  0.3228   0.8312   0.4301   0.7584   0.8552   0.3211   0.9670
        |
     yazd |   0.2991  -0.4155   0.3690   0.3779  -0.3881   0.0652   0.5934*
        |  0.3208   0.1580   0.2147   0.2030   0.1900   0.8324   0.0325
        |
  hormozgan |  -0.0281  -0.1678   0.4097   0.2218  -0.4640  -0.5353  -0.2743
        |  0.9273   0.5838   0.1645   0.4664   0.1102   0.0594   0.3644
        |
    tehran |   0.0351  -0.1820   0.5126   0.5493  -0.1040   0.2790   0.3455
```

```
          |   0.9093   0.5518   0.0732   0.0518   0.7352   0.3560   0.2476
          |
    ardabil |  -0.3541   0.3220  -0.2180   0.1034   0.0894   0.1118  -0.3409
          |   0.2352   0.2833   0.4744   0.7368   0.7715   0.7162   0.2543
          |
       qom |  -0.1215  -0.0677   0.2780   0.4996  -0.1220  -0.2178  -0.2218
          |   0.6926   0.8260   0.3577   0.0821   0.6912   0.4748   0.4665
          |
     qazvin |  -0.0900   0.2799   0.1526   0.6108* -0.5150   0.5461   0.5235
          |   0.7701   0.3544   0.6187   0.0266   0.0717   0.0535   0.0663
          |
   golestan |  -0.3582   0.3393  -0.2122   0.0588   0.3265   0.3734  -0.5207
          |   0.2295   0.2567   0.4864   0.8487   0.2763   0.2088   0.0681
          |
          | chahar~i lorestan    ilam kohgil~d  bushehr   zanjan   semnan
-------------+------------------------------------------------------------------
chaharmaha~i |   1.0000
          |
          |
   lorestan |   0.0979   1.0000
          |   0.7503
          |
      ilam |  -0.2746  -0.2760   1.0000
          |   0.3639   0.3614
          |
kohgiluyeh~d |  -0.2944   0.3321   0.3551   1.0000
          |   0.3289   0.2676   0.2337
          |
    bushehr |   0.1914  -0.4380   0.3159  -0.0326   1.0000
          |   0.5310   0.1344   0.2931   0.9158
          |
     zanjan |   0.0367  -0.4999   0.2970  -0.1777   0.0233   1.0000
          |   0.9054   0.0819   0.3244   0.5613   0.9397
          |
     semnan |   0.0712   0.4136  -0.3224   0.6256* -0.2463  -0.4718   1.0000
          |   0.8172   0.1601   0.2827   0.0222   0.4173   0.1036
          |
      yazd |   0.4311  -0.0764  -0.0493  -0.4517  -0.3320   0.3507  -0.4127
          |   0.1414   0.8041   0.8730   0.1212   0.2678   0.2400   0.1610
          |
  hormozgan |  -0.2777  -0.0023   0.0215  -0.0273  -0.4615  -0.4311   0.2702
          |   0.3583   0.9941   0.9445   0.9294   0.1124   0.1413   0.3720
          |
     tehran |   0.2789  -0.3556   0.5060   0.0339   0.3858   0.3247  -0.3902
          |   0.3562   0.2331   0.0777   0.9125   0.1929   0.2791   0.1874
          |
    ardabil |  -0.1073  -0.1438  -0.1084   0.0449   0.2201  -0.0010   0.1886
          |   0.7272   0.6392   0.7246   0.8843   0.4700   0.9975   0.5372
          |
       qom |  -0.0929   0.0941   0.2467   0.3202  -0.3150  -0.1426   0.3900
          |   0.7628   0.7598   0.4165   0.2861   0.2946   0.6420   0.1878
          |
     qazvin |   0.4016  -0.5054   0.1943  -0.4375   0.1151   0.7899* -0.4552
          |   0.1738   0.0781   0.5247   0.1349   0.7080   0.0013   0.1180
          |
   golestan |  -0.2252  -0.0714   0.1356   0.1488   0.2388   0.0731   0.0345
          |   0.4594   0.8166   0.6586   0.6276   0.4321   0.8125   0.9109
          |
          |    yazd hormoz~n   tehran  ardabil     qom   qazvin golestan
-------------+------------------------------------------------------------------
       yazd |   1.0000
          |
          |
  hormozgan |   0.0588   1.0000
          |   0.8487
          |
     tehran |   0.2099  -0.2336   1.0000
          |   0.4912   0.4423
          |
    ardabil |  -0.6040* -0.0054   0.1233   1.0000
          |   0.0288   0.9860   0.6883
```

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      |
    qom |  -0.1261   0.5565*  0.2497   0.3365   1.0000
      |   0.6813   0.0482   0.4107   0.2609
      |
 qazvin |   0.5322  -0.2160   0.3651   0.0449  -0.0945   1.0000
      |   0.0612   0.4784   0.2199   0.8841   0.7587
      |
golestan |  -0.7348* -0.2561   0.1781   0.7616*  0.2562  -0.0794   1.0000
      |   0.0042   0.3984   0.5604   0.0025   0.3981   0.7966
          |
```

Appendix 6C Correlation between mean household expenditure & provincial GINI, 2010

	Mean household expenditure	GINI
expenditure	1	
GINI	-0.2695	
Significance	0.1498	1

Appendix 6D Correlation of expenditures between 4 major provinces & GINI, 1997-2010

Correlation between mean expenditures and GINI 1997-2010 for the four most populous provinces of Tehran, Khorasan, Esfahan and Fars

Tehran	logmean	
tehranGINI	1	
logmean	-0.4281	1
Significance	0.1267	

Khorasan Razavi	logmean	
khorasanra~i	1	
logmean	-0.2281	1
Signifiance	0.4328	

Esfahan	logmean	
GINI	1	
logmean	-0.5199	1
Significance	0.0567	

Fars	logmean	
Fars	1	
farslogmean	0.154	1
Signifiance	0.5991	

Appendix 6E Log mean equivalence expenditure by ethnicity, 1998-2010 nominal Riyals

Please note that these figures have been scaled for household size, and hence should be used for comparative purposes not as absolute figures.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Persian	15.63	15.87	16.01	16.17	16.41	16.57	16.80	16.97	17.09	17.31	17.45	17.53	17.67
Azeris	15.38	15.56	15.80	15.90	16.16	16.33	16.61	16.73	16.87	17.02	17.29	17.37	17.52
Kurds	15.11	15.36	15.60	15.76	16.07	16.33	16.55	16.69	16.82	17.03	17.18	17.30	17.47
Lurs	15.17	15.37	15.56	15.70	15.90	16.09	16.44	16.58	16.74	16.84	17.11	17.26	17.37
Arabs	15.47	15.42	15.70	15.84	16.03	16.13	16.47	16.58	16.74	16.84	17.24	17.40	17.48
Baloochis	14.97	15.19	15.39	15.41	15.58	15.76	16.06	16.25	16.32	16.36	16.46	16.48	16.76
Turkmens	14.96	15.44	15.74	15.74	15.89	16.07	16.23	16.46	16.60	16.73	16.93	17.07	17.27
Gilaks	15.38	15.71	15.90	16.07	16.05	16.20	16.61	16.70	16.96	17.19	17.29	17.40	17.47
Mazandaranis	15.44	15.68	15.94	15.97	16.26	16.43	16.78	17.01	17.14	17.31	17.33	17.34	17.61

Appendix 6F Ethnic mean household expenditure and ranking, in Riyals 2010

These figures have been scaled for household size

Rank	Ethnicity	Mean Expenditure
1	Persians	47,100,086
2	Mazanadaranis	44,563,539
3	Azeri Turks	40,531,465
4	Arabs	39,060,861
5	Gilaks	38,812,642
6	Kurds	38,805,252
7	Lurs	35,006,037
8	Turkmens	31,559,451
9	Baloochis	18,994,661

Appendix 6G Ethnic regional GINI and mean expenditures, 1998-2010

Figures in nominal Riyals

Total ethnic group

	Persian				Ethnic				Persian: Ethnic
	Mean	GINI Persian	Pop share		Mean	GINI Ethnic	Pop share		
1998	6,096,371	0.43	0.58		4,407,648	0.41	0.42		1.38
1999	7,819,874	0.43	0.58		5,305,425	0.40	0.42		1.47
2000	9,022,792	0.44	0.58		6,709,036	0.41	0.42		1.34
2001	10,531,766	0.45	0.58		7,558,850	0.41	0.42		1.39
2002	13,491,132	0.45	0.58		9,387,119	0.40	0.42		1.44
2003	15,796,330	0.42	0.58		11,265,148	0.39	0.42		1.40
2004	19,768,456	0.43	0.58		15,319,914	0.41	0.42		1.29
2005	23,424,254	0.42	0.59		17,657,483	0.41	0.41		1.33
2006	26,457,499	0.44	0.59		20,654,274	0.43	0.41		1.28
2007	33,017,716	0.44	0.59		24,101,250	0.42	0.41		1.37
2008	38,155,038	0.40	0.60		28,980,687	0.41	0.40		1.32
2009	41,147,854	0.41	0.60		31,965,653	0.41	0.40		1.29
2010	47,441,210	0.41	0.60		37,469,611	0.40	0.40		1.27

Azeris

	Azeris				Non Azeri Ethnic				Persian: Azeris	Azeris : Ethnic Non Azeris
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	4,783,890	0.41	0.09		4,307,075	0.40	0.33		1.27	1.11
1999	5,734,770	0.40	0.09		5,190,658	0.39	0.33		1.36	1.10
2000	7,243,089	0.42	0.09		6,566,279	0.40	0.33		1.25	1.10
2001	8,006,115	0.42	0.09		7,439,293	0.40	0.33		1.32	1.08
2002	10,444,035	0.42	0.09		9,104,597	0.40	0.33		1.29	1.15
2003	12,404,646	0.40	0.09		10,960,550	0.39	0.33		1.27	1.13
2004	16,291,275	0.41	0.09		15,059,503	0.41	0.33		1.21	1.08
2005	18,411,214	0.40	0.08		17,461,552	0.42	0.32		1.27	1.05
2006	21,189,580	0.42	0.08		20,514,816	0.43	0.32		1.25	1.03
2007	24,603,124	0.40	0.08		23,970,716	0.42	0.32		1.34	1.03
2008	32,307,492	0.41	0.08		28,132,839	0.41	0.32		1.18	1.15
2009	34,997,990	0.38	0.08		31,203,617	0.41	0.32		1.18	1.12
2010	40,531,464	0.37	0.08		36,682,303	0.40	0.32		1.17	1.10

Kurds

	Kurds				Non Kurd Ethnic				Persian: Kurds	Kurds: Other ethnicities
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	3,677,169	0.36			4,599,868	0.41			1.66	0.80
1999	4,517,352	0.37			5,512,800	0.40			1.73	0.82
2000	5,814,795	0.39			6,944,348	0.41			1.55	0.84
2001	6,848,322	0.40			7,745,820	0.41			1.54	0.88
2002	9,364,463	0.41			9,393,081	0.40			1.44	1.00
2003	12,044,085	0.39			11,060,177	0.39			1.31	1.09
2004	15,122,379	0.41			15,372,232	0.41			1.31	0.98
2005	17,404,767	0.40			17,722,095	0.42			1.35	0.98
2006	20,070,175	0.40			20,803,803	0.43			1.32	0.96
2007	24,872,044	0.38			23,904,218	0.42			1.33	1.04
2008	28,969,368	0.38			28,983,593	0.41			1.32	1.00
2009	32,445,689	0.38	0.08		31,843,257	0.41	0.32		1.27	1.02
2010	39,375,584	0.37	0.08		36,976,744	0.41	0.32		1.20	1.06

Lurs

	Lurs				Non Lurs Ethnic				Persian Lurs	Lurs:Other ethnicities
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	3,893,873	0.37			4,465,320	0.41			1.57	0.87
1999	4,711,807	0.38			5,372,059	0.40			1.66	0.88
2000	5,715,798	0.38			6,820,527	0.41			1.58	0.84
2001	6,581,055	0.38			7,668,608	0.41			1.60	0.86
2002	8,042,775	0.39			9,538,023	0.40			1.68	0.84
2003	9,722,314	0.36			11,438,332	0.39			1.62	0.85
2004	13,828,309	0.35			15,487,862	0.41			1.43	0.89
2005	15,897,607	0.38			17,854,201	0.42			1.47	0.89
2006	18,706,130	0.40			20,871,889	0.43			1.41	0.90
2007	20,571,188	0.36			24,495,596	0.42			1.61	0.84
2008	27,015,826	0.40			29,198,803	0.41			1.41	0.93
2009	31,349,427	0.42			32,033,720	0.40			1.31	0.98
2010	35,006,037	0.41	0.04		37,741,847	0.40	0.36		1.36	0.93

Arabs

	Arabs				Non Arabs Ethnic				Persians: Arabs	Arabs:Other Ethnicities
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	5,343,906	0.40			4,226,957	0.40			1.14	1.26
1999	5,048,738	0.35			5,354,964	0.40			1.55	0.94
2000	6,440,901	0.36			6,760,784	0.42			1.40	0.95
2001	7,698,014	0.36			7,531,993	0.42			1.37	1.02
2002	9,120,059	0.32			9,438,660	0.41			1.48	0.97
2003	10,413,143	0.31			11,429,579	0.40			1.52	0.91
2004	15,148,552	0.39			15,353,095	0.41			1.30	0.99
2005	17,048,367	0.40			17,776,898	0.41			1.37	0.96
2006	20,323,559	0.42			20,718,979	0.43			1.30	0.98
2007	22,103,056	0.40			24,493,150	0.42			1.49	0.90
2008	29,075,950	0.38			28,961,760	0.41			1.31	1.00
2009	33,883,394	0.40			31,580,906	0.41			1.21	1.07
2010	36,524,866	0.40	0.07		37,658,597	0.40	0.33		1.30	0.97

Baloochis

	Baloochis				Non baloochi ethncities				Persian: Baloochis	Baloochis: Other Ethnicities
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	3,164,400	0.41			4,481,213	0.40			1.93	0.71
1999	3,945,600	0.43			5,385,888	0.39			1.98	0.73
2000	4,807,596	0.45			6,821,547	0.40			1.88	0.70
2001	4,927,978	0.46			7,714,523	0.40			2.14	0.64
2002	5,848,687	0.46			9,596,494	0.39			2.31	0.61
2003	6,999,589	0.46			11,517,548	0.38			2.26	0.61
2004	9,392,633	0.43			15,671,666	0.40			2.10	0.60
2005	11,404,494	0.41			18,092,362	0.41			2.05	0.63
2006	12,187,078	0.41			21,238,342	0.42			2.17	0.57
2007	12,782,152	0.43			24,887,520	0.41			2.58	0.51
2008	14,102,456	0.46			30,041,309	0.40			2.71	0.47
2009	14,328,158	0.47	0.03		33,288,751	0.39	0.37		2.87	0.43
2010	18,994,660	0.48	0.03		38,764,914	0.39	0.37		2.50	0.49

Turkmens

	Turkmens				Non Turkmen ethnic				Persian: Turkmen	Turkmen: Other ethnicities
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	3,137,729	0.41			4,477,277	0.40			1.94	0.70
1999	5,081,037	0.44			5,317,728	0.39			1.54	0.96
2000	6,845,764	0.47			6,701,539	0.40			1.32	1.02
2001	6,850,134	0.46			7,597,709	0.40			1.54	0.90
2002	7,984,245	0.46			9,464,038	0.40			1.69	0.84
2003	9,546,810	0.46			11,359,363	0.39			1.65	0.84
2004	11,162,567	0.47			15,548,522	0.40			1.77	0.72
2005	14,069,016	0.46			17,856,866	0.41			1.66	0.79
2006	16,180,141	0.45			20,903,135	0.43			1.64	0.77
2007	18,390,726	0.42			24,418,690	0.41			1.80	0.75
2008	22,494,608	0.46			29,350,465	0.40			1.70	0.77
2009	25,793,710	0.44			32,321,307	0.40			1.60	0.80
2010	31,559,450	0.45	0.02		37,802,632	0.39	0.38		1.50	0.83

Gilaks

	Gilaks				Non Gilak Ethnic				Persian:Gilaks	Gilaks:Other ethnicities
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	4,767,534	0.43			4,367,847	0.40			1.28	1.09
1999	6,654,955	0.39			5,156,175	0.39			1.18	1.29
2000	8,021,196	0.40			6,563,918	0.41			1.12	1.22
2001	9,504,459	0.40			7,343,677	0.41			1.11	1.29
2002	9,351,427	0.37			9,391,067	0.40			1.44	1.00
2003	10,817,389	0.38			11,314,668	0.39			1.46	0.96
2004	16,392,701	0.36			15,205,075	0.41			1.21	1.08
2005	17,910,419	0.40			17,630,089	0.41			1.31	1.02
2006	23,288,179	0.43			20,368,692	0.43			1.14	1.14
2007	29,188,175	0.45			23,550,521	0.41			1.13	1.24
2008	32,355,276	0.39			28,625,835	0.41			1.18	1.13
2009	36,177,075	0.41			31,530,460	0.40			1.14	1.15
2010	38,812,642	0.37	0.04		37,329,478	0.40	0.36		1.22	1.04

Mazandaranis

	Mazandaranis				Non Mazandarani Ethnic				Persian: Mazanadarani	Mazandarani: Other Ethnicities
	Mean	GINI	Pop share		Mean	GINI	Pop share			
1998	5,066,002	0.4			4,325,754	0.40			1.20	1.17
1999	6,465,067	0.38			5,161,176	0.39			1.21	1.25
2000	8,387,722	0.39			6,500,221	0.41			1.08	1.29
2001	8,642,788	0.39			7,424,017	0.41			1.22	1.16
2002	11,509,666	0.38			9,123,092	0.40			1.17	1.26
2003	13,643,533	0.36			10,969,297	0.39			1.16	1.24
2004	19,464,288	0.41			14,802,789	0.41			1.02	1.31
2005	24,402,190	0.42			16,821,867	0.41			0.96	1.45
2006	27,747,889	0.42			19,774,424	0.42			0.95	1.40
2007	32,816,019	0.41			23,021,343	0.41			1.01	1.43
2008	33,704,341	0.38			28,388,803	0.41			1.13	1.19
2009	33,821,497	0.35			31,732,755	0.41			1.22	1.07
2010	44,563,539	0.37	0.04		36,588,756	0.40	0.35		1.06	1.22

Appendix 6H Urban & rural household expenditures 1997-2007[108]

In constant 2004 Riyals, equivalence expenditures

Year	Urban deflated	Rural deflated	Urban:Rural
1997	14,482,929	7,771,163	1.86
1998	15,235,844	7,947,182	1.92
1999	15,866,678	8,215,585	1.93
2000	16,892,218	8,201,100	2.06
2001	17,746,914	8,194,272	2.17
2002	19,466,667	8,827,573	2.21
2003	19,492,503	9,609,765	2.03
2004	21,700,000	11,200,000	1.94
2005	22,644,928	11,160,714	2.03
2006	23,238,866	11,200,432	2.07
2007	24,076,607	11,396,410	2.11

Appendix 6I Urban to Rural parametric 'general means' ratio, 2001-2010

alpha	2010	2009	2007	2005	2003	2001
-5	2.02	1.88	2.11	2.94	2.60	1.91
-4	2.22	2.02	2.08	2.68	2.39	1.96
-3	2.29	2.15	2.05	2.29	2.19	2.10
-2	2.17	2.16	2.03	2.03	2.04	2.16
-1	2.07	2.11	2.02	1.97	1.97	2.07
0	2.03	2.08	2.05	1.95	1.96	2.06
1	2.02	2.06	2.09	2.00	2.00	2.12
2	2.01	1.93	2.14	2.04	2.08	2.29
3	1.96	1.64	2.14	2.03	2.16	2.58
4	1.99	1.63	2.08	1.95	2.23	2.98
5	2.16	1.80	2.04	1.84	2.32	3.36

[108] The reason the analysis is only carried out up to 2007 rather than 2010, is due to rural CPI figures only being available until 2007 at the time of publication.

Appendix 6J Urban public & private sector wage earning household-heads

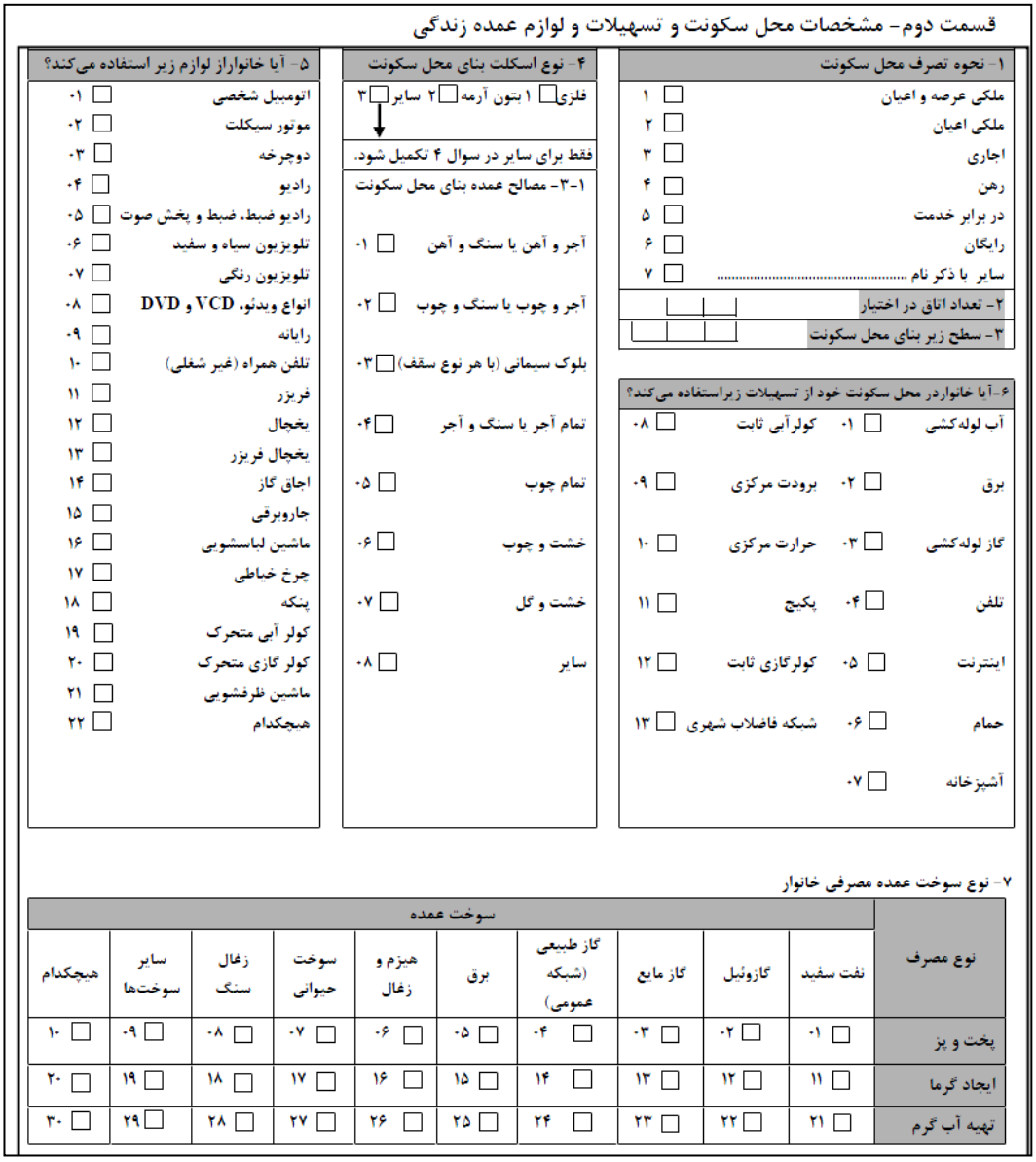
Years: 1990, 1997-2009

Expenditures deflated by urban CPI to constant 2004 Riyals.

Equivalence expenditures have been used.

Year	Public deflated	Private deflated	Public : Private	Absolute Difference
1990	13,705,390	10,276,196	1.33	3,429,194
…	…	…	…	…
1997	15,909,294	11,836,552	1.34	4,072,742
1998	16,853,828	12,571,716	1.34	4,282,112
1999	17,985,260	13,021,310	1.38	4,963,950
2000	19,759,450	13,231,703	1.49	6,527,747
2001	20,524,691	13,831,400	1.48	6,693,292
2002	22,933,333	14,933,333	1.54	8,000,000
2003	23,298,731	15,916,955	1.46	7,381,776
2004	27,200,000	17,400,000	1.56	9,800,000
2005	29,438,406	18,206,522	1.62	11,231,884
2006	31,255,061	18,380,567	1.70	12,874,494
2007	31,805,746	19,151,847	1.66	12,653,899
2008	28,641,571	18,876,159	1.52	9,765,412
2009	29,211,823	17,783,251	1.64	11,428,571

Appendix 7A Asset questionnaire in 2010 household survey



قسمت دوم- مشخصات محل سکونت و تسهیلات و لوازم عمده زندگی

۱- نحوه تصرف محل سکونت

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ملکی اعیان	۲
اجاری	۳
رهن	۴
در برابر خدمت	۵
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۲- تعداد اتاق در اختیار

۳- سطح زیر بنای محل سکونت

۴- نوع اسکلت بنای محل سکونت

فلزی ۱ بتون آرمه ۲ سایر ۳

فقط برای سایر در سوال ۴ تکمیل شود.

۴-۱- مصالح عمده بنای محل سکونت

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۵- آیا خانوار از لوازم زیر استفاده می‌کند؟

اتومبیل شخصی	۰۱
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۶- آیا خانوار در محل سکونت خود از تسهیلات زیر استفاده می‌کند؟

آب لوله‌کشی	۰۱	کولر آبی ثابت	۰۸
برق	۰۲	برودت مرکزی	۰۹
گاز لوله‌کشی	۰۳	حرارت مرکزی	۱۰
تلفن	۰۴	پکیج	۱۱
اینترنت	۰۵	کولرگازی ثابت	۱۲
حمام	۰۶	شبکه فاضلاب شهری	۱۳
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۷- نوع سوخت عمده مصرفی خانوار

نوع مصرف	سوخت عمده									
	نفت سفید	گازوئیل	گاز مایع	گاز طبیعی (شبکه عمومی)	برق	هیزم و زغال	سوخت حیوانی	زغال سنگ	سایر سوخت‌ها	هیچکدام
پخت و پز	۰۱	۰۲	۰۳	۰۴	۰۵	۰۶	۰۷	۰۸	۰۹	۱۰
ایجاد گرما	۱۱	۱۲	۱۳	۱۴	۱۵	۱۶	۱۷	۱۸	۱۹	۲۰
تهیه آب گرم	۲۱	۲۲	۲۳	۲۴	۲۵	۲۶	۲۷	۲۸	۲۹	۳۰

Appendix 7B Weighted mean and standard deviations, urban household survey 2010

	Asset variable	Mean	Std. Dev.	Min	Max	Frequency in sample
Household characteristics						
1	Household size	96.39544	49.25321	3	700	18701
2	Number of rooms	3.455899	1.128216	1	15	18701
3	Ownership	0.659512	0.473886	0	1	12783
4	Steel	0.214362	0.41039	0	1	2685
5	Reinforced Concrete	0.110355	0.31334	0	1	1854
6	Iron & brick or iron & stone	0.545369	0.497951	0	1	10591
7	Wood & brick or wood & stone	0.055704	0.229355	0	1	1379
8	Concrete blocks	0.035234	0.184376	0	1	1294
9	Brick, or stone & brick	0.004884	0.069715	0	1	96
10	Wooden	0.000194	0.013938	0	1	4
11	Cob & wood	0.013216	0.1142	0	1	361
12	Cob & mud	0.01153	0.106759	0	1	313
13	Other construction material	0.009212	0.095536	0	1	130
Utility access						
14	Fixed water cooler	0.611513	0.487419	0	1	8958
15	Sewage	0.25491	0.435822	0	1	4606
16	Internet	0.161436	0.367943	0	1	2575
17	Telephone	0.876046	0.329538	0	1	16088
18	Cellphone	0.883626	0.320682	0	1	16427
19	Fixed gas cooler	0.114991	0.31902	0	1	2835
20	Hot water fuel natural gas	0.908823	0.287869	0	1	15340
21	Heating fuel natural gas	0.908966	0.287666	0	1	15342
22	Cooking fuel natural gas	0.909907	0.286322	0	1	15377
23	Piped natural gas	0.91638	0.276824	0	1	15485
24	Central heating	0.052215	0.222467	0	1	341
25	Kitchen	0.967167	0.178203	0	1	17902
26	Bathroom	0.978003	0.146677	0	1	18161
27	Boiler	0.012186	0.109717	0	1	116
28	Central cooling	0.00631	0.079187	0	1	48
29	Electricity	0.999986	0.003811	0	1	18700
30	Piped water	0.996021	0.062952	0	1	18619
Durable assets						
31	Radio	0.048795	0.215445	0	1	1275
32	Portable water cooler	0.036576	0.187724	0	1	848
33	Colour TV	0.972847	0.162532	0	1	18201
34	Dishwasher	0.022878	0.149518	0	1	304
35	Oven	0.983538	0.127249	0	1	18403
36	Portable gas cooler	0.01636	0.126858	0	1	697
37	Black and white TV	0.010595	0.10239	0	1	215
38	Electric fan	0.435302	0.49581	0	1	9912
39	Sewing machine	0.583489	0.492994	0	1	10336
40	Fridge Freezer	0.387934	0.487293	0	1	6450
41	Computer	0.374632	0.484041	0	1	6244
42	Car	0.372863	0.483579	0	1	6903
43	VHS machine	0.6343	0.481639	0	1	11483
44	Fridge	0.638389	0.48048	0	1	12767
45	Music stereo	0.350508	0.477142	0	1	6557
46	Freezer	0.286606	0.452188	0	1	5051
47	Washing machine	0.759797	0.427218	0	1	12975
48	Motorbike	0.179139	0.383479	0	1	3901
49	Hoover	0.859729	0.347278	0	1	15263
50	Bicycle	0.120248	0.32526	0	1	2321
51	No durables	0.000104	0.010211	0	1	3

Appendix 7C Weighted mean and standard deviations, rural household survey 2010

Household characteristics						
1	Household size	82.23755	42.29967	6	500	19584
2	Number of rooms	3.255958	1.193705	0	15	19584
3	Ownership	0.849683	0.357391	0	1	16780
4	Steel	0.03923	0.194146	0	1	632
5	Reinforced Concrete	0.048884	0.21563	0	1	890
6	Iron & brick or iron & stone	0.402491	0.490412	0	1	7996
7	Wood & brick or wood & stone	0.193559	0.395098	0	1	3468
8	Concrete blocks	0.113631	0.317371	0	1	2133
9	Brick, or stone & brick	0.006395	0.079717	0	1	125
10	Wooden	0.003883	0.062192	0	1	57
11	Cob & wood	0.11249	0.315976	0	1	2546
12	Cob & mud	0.042547	0.20184	0	1	1109
13	Other construction material	0.036976	0.188708	0	1	633
Utility access						
14	Fixed water cooler	0.264494	0.441075	0	1	5338
15	Sewage	0.016473	0.127289	0	1	283
16	Internet	0.031019	0.173373	0	1	564
17	Telephone	0.704257	0.456388	0	1	13925
18	Cellphone	0.732291	0.442776	0	1	13995
19	Fixed gas cooler	0.114456	0.318372	0	1	2075
20	Hot water fuel natural gas	0.399013	0.489708	0	1	7228
21	Heating fuel natural gas	0.401967	0.490308	0	1	7294
22	Cooking fuel natural gas	0.403352	0.490583	0	1	7322
23	Piped natural gas	0.414139	0.492585	0	1	7531
24	Central heating	0.002543	0.05036	0	1	31
25	Kitchen	0.815713	0.387728	0	1	16021
26	Bathroom	0.791439	0.40629	0	1	15534
27	Boiler	0.000346	0.018587	0	1	7
28	Central cooling	0.000453	0.021267	0	1	17
29	Electricity	0.995107	0.069781	0	1	19488
30	Piped water	0.931012	0.25344	0	1	18361
Durable assets						
31	Radio	0.043643	0.204304	0	1	1146
32	Portable water cooler	0.034483	0.18247	0	1	739
33	Colour TV	0.931273	0.252996	0	1	18164
34	Dishwasher	0.001093	0.033048	0	1	19
35	Oven	0.942692	0.232437	0	1	18508
36	Portable gas cooler	0.033602	0.180206	0	1	832
37	Black and white TV	0.019889	0.139623	0	1	465
38	Electric fan	0.561039	0.496273	0	1	10904
39	Sewing machine	0.4161	0.492923	0	1	7828
40	Fridge Freezer	0.197015	0.397754	0	1	3747
41	Computer	0.10068	0.300913	0	1	1856
42	Car	0.175142	0.380099	0	1	3495
43	VHS machine	0.489599	0.499905	0	1	9278
44	Fridge	0.806713	0.394886	0	1	15916
45	Music stereo	0.231475	0.421786	0	1	4614
46	Freezer	0.127612	0.333666	0	1	2548
47	Washing machine	0.381442	0.485753	0	1	7216
48	Motorbike	0.314577	0.464359	0	1	6406
49	Hoover	0.538652	0.498517	0	1	10266
50	Bicycle	0.078736	0.269333	0	1	1464
51	No durables	0.002646	0.051367	0	1	52

Appendix 7D Urban mean wealth index score by household expenditure deciles, 2010

Household expenditure deciles	Mean wealth index score
1	-2.37666
2	-1.29833
3	-0.77106
4	-0.36101
5	-0.00366
6	0.331973
7	0.502428
8	0.873206
9	1.161598
10	1.943304

Appendix 7E Rural mean wealth index score by household expenditure deciles, 2010

Household expenditure deciles	Mean wealth index score
1	-2.325582
2	-1.24924
3	-0.761508
4	-0.3495054
5	-0.0057517
6	0.2431082
7	0.5090931
8	0.8580307
9	1.266229
10	1.855072